USER MANUAL

Netbiter® EasyConnect Gateway

Doc ID: HMSI-168-92
Version: 4.00

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1 Preface

1.1 About This Document

This manual describes how to install and configure Netbiter EasyConnect gateways.

For additional related documentation and file downloads, please visit the Netbiter support website at www.netbiter.com/support.

1.2 Related Documents

Related documents

Document	Author
Netbiter EasyConnect Gateway Installation Guides	HMS
Netbiter Argos Administration Manual	HMS
Netbiter Remote Access User Manual	HMS

1.3 Document history

Summary of recent changes

Change	Where (section no.)
Updated section on EC350 LED indicators.	*4.5*
Replaced D-sub graphic for EC220.	*3.2.3*
Changed “physical network” to “logical network”.	*3.4.4*, *9.3.5*
Updated IP configuration section.	*7.2*
Updated local configuration section.	*9*
Updated class attribute descriptions.	*11.2.2*
Added info about proxy support.	*12.2*
Updated screenshots in most sections.	—

Revision list

Version	Date	Author	Description
1.00	Nov 2012	SDa	First official release.
1.10	Mar 2013	SDa	New chapter on Ethernet installation.
2.00	November 2013	SDa	Added EC350.
2.10	January 2014	SDa	Removed EC150-M. Removed info on relay in EC150.
2.11	April 2014	SDa	Minor correction to dimensions. Added Japanese approval information.
2.20	May 2014	SDa	Added EC310. Updated LEDs for EC350.
2.30	September 2014	SDa	Certifications updated for EC310/EC350.
2.40	November 2014	SDa	Added EtherNet/IP support. Updated specs for EC3xx.
2.50	December 2014	ThN	Changed tolerance values.
3.00	May 2015	ThN	Multiple corrections and updates. Revised document structure and layout.
3.10	June 2015	ThN	Added info on symbolic segment addressing.
4.00	Sep 2015	ThN	Misc. corrections and updates New layout

1.4 Conventions

Unordered (bulleted) lists are used for:

- Itemized information
- Instructions that can be carried out in any order

Ordered (numbered or alphabetized) lists are used for instructions that must be carried out in sequence:

1. First do this,
2. Then open this dialog, and
   a. set this option...
   b. ...and then this one.

Bold typeface indicates interactible parts, such as connectors and switches on the hardware, or menus and buttons in a graphical user interface.

```
Monospaced text is used to indicate program code and other
kinds of data input/output such as configuration scripts.
```

This is a cross-reference within this document: *Conventions, p. 4*

This is an external link (URL): www.hms-networks.com

This is additional information which may facilitate installation and/or operation.

This instruction must be followed to avoid a risk of reduced functionality and/or damage to the equipment, or to avoid a network security risk.

Caution

This instruction must be followed to avoid a risk of personal injury.

2 Installation

2.1 Netbiter EC150/EC250

Netbiter EC150 and EC250 are supplied ready for mounting on a DIN rail.

Mounting

1. Hook the unit onto the upper lip of the rail.
2. Press the unit towards the rail until it snaps into place.

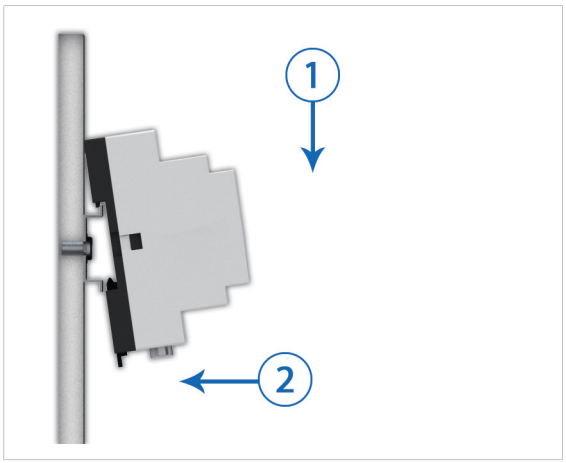


Fig. 1 Mounting on DIN rail

Removing

1. Insert a flat-head screwdriver into the slotted tab on the bottom of the unit and pull the tab gently downwards.
2. Pull the bottom end of the unit free of the rail and lift the unit from the rail.

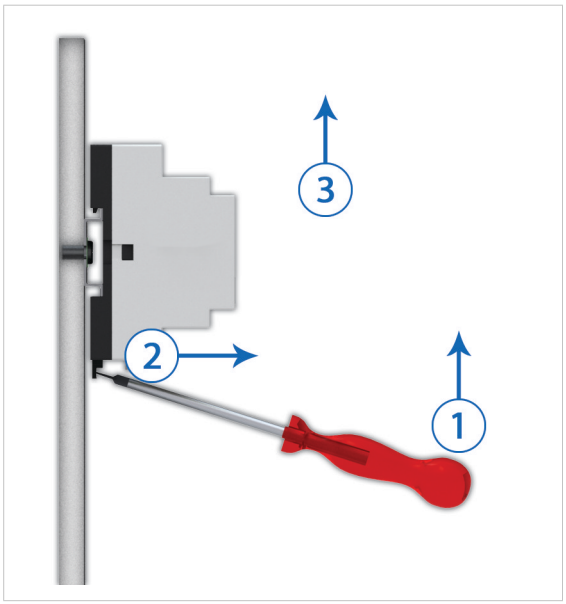


Fig. 2 Removing from DIN rail

2.2 Netbiter EC220, EC310 and EC350

Wall Mount

Fig. 3 EC350 wall mount

The Netbiter EC220, EC310 and EC350 can be screw-mounted directly to a flat surface using the screw holes in the metal housing.

DIN Rail Mount

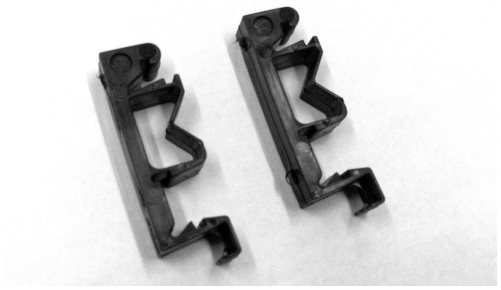


Fig. 4 DIN rail mounting kit

The Netbiter EC220, EC310 and EC350 can also be mounted on a DIN rail using an optional rail mounting kit.

3 Connections

Netbiter EasyConnect gateways can be connected to Modbus devices via different interfaces and physical connections. Which interface(s) to use is configured in Netbiter Argos.

3.1 Netbiter EC150

3.1.1 Terminal block (12–pin)

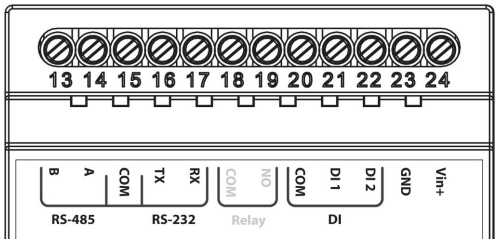


Fig. 5 Terminal block

Terminal block connections

Pin	Label	Function	Note
24	Vin+	Power 9–24 VDC/VAC	EC150 can optionally be powered by 9–24 VAC.
23	Vin-	PE ground	
22	DI:DI 2	Digital input #2	Low = 0–2 VDC, High = 10–24 VDC
21	DI:DI 1	Digital input #1	Low = 0–2 VDC, High = 10–24 VDC
20	DI:COM	Digital input common	
17	RS-232:RX	RS-232 Receive	
16	RS-232:TX	RS-232 Transmit	
15	COM	Serial interface common	Shared between RS-232 and RS485
14	RS-485:A	RS-485 Line A	
13	RS-485:B	RS-485 Line B	

3.1.2 D-sub Connector

The 9-pin male D-sub connector provides an RS-232 interface for Modbus RTU.

D-sub connector pin layout

Pin	Function
1	CD (Carrier Detect)
2	Rx (Receive)
3	Tx (Transmit)
4	DTR (Data Terminal Ready)
5	GND
6	DSR (Data Set Ready)
7	RTS (Request To Send)
8	CTS (Clear To Send)
9	RI (Ring Indicator)

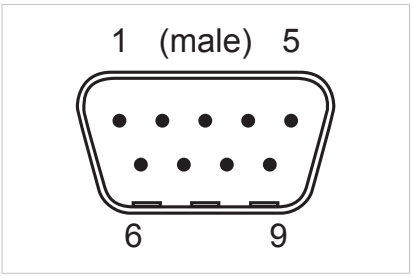


Fig. 6 D-sub connector

3.1.3 Ethernet Connector

The RJ-45 socket provides Ethernet network connection. It also supports Modbus TCP via Ethernet, which can be used at the same time as Modbus RTU units on another interface.

Ethernet connector pin layout

Pin	Function
1	TD+
2	TD-
3	RD+
4, 5, 7, 8	Termination
6	RD-

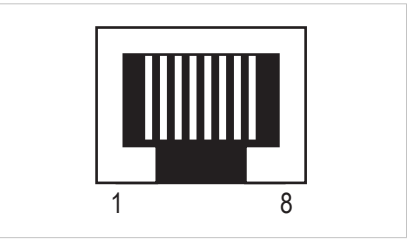


Fig. 7 Ethernet connector

3.2 Netbiter EC220

3.2.1 Terminal Block (12–pin)

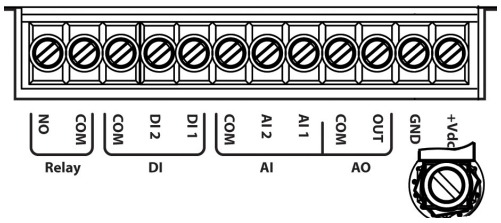


Fig. 8 Terminal block

Terminal block pin layout

Pin	Function	Note
+Vdc	Power 12–24 VDC	
GND	PE ground	
AO:OUT	Analog output	0–10 VDC
AO.COM	Analog output common	Internally connected to GND
AI:AI 1	Analog input #1	PT100, current or voltage (selected with internal switch)
AI:AI 2	Analog input #2	
AI:COM	Analog input common	Internally connected to GND
DI:DI1	Digital input #1	Low = 0–1 VDC, High = 9–24 VDC
DI:DI2	Digital input #2	
DI:COM	Digital input common	
Relay:COM	Relay output common	
Relay:NO	Normally open connected	Rated load: 1 A @ 24 VDC

Analog Input Configuration Switches

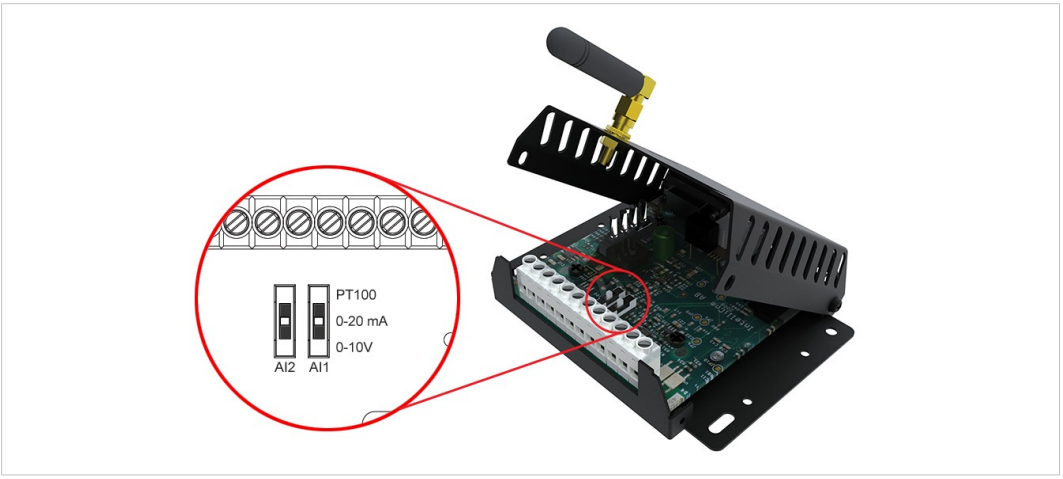


Fig. 9 EC220 DIP switch

The analog inputs are configured with two DIP switches inside the unit. Take care not to damage the antenna cable when opening/closing the cover.

EC220 DIP switch setting

Setting	Function	Note
PT100	Temperature sensor (default)	-50 to +150 °C
0–20 mA	Current	Input resistance 270 Ω
0–10 VDC	Voltage	Input resistance 280 Ω

3.2.2 RS-485 Serial Interface (3–pin Connector)

The RS-485 serial interface can be used to connect Modbus RTU devices.

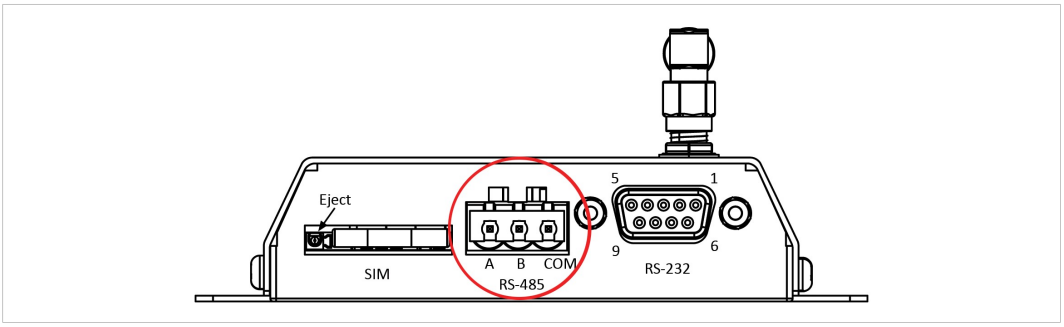


Fig. 10 RS-485 connector

RS-485 connector pin layout

Pin	Function
A	RS-485 A line
B	RS-485 B line
COM	RS-485 common

3.2.3 D-sub Connector

The 9-pin female D-sub connector provides an RS-232 interface for Modbus RTU and for connecting a GPS receiver.

D-sub connector pin layout

Pin	Function
1	CD (Carrier Detect)
2	Rx (Receive)
3	Tx (Transmit)
4	DTR (Data Terminal Ready)
5	GND
6	DSR (Data Set Ready)
7	RTS (Request To Send)
8	CTS (Clear To Send)
9	RI (Ring Indicator)

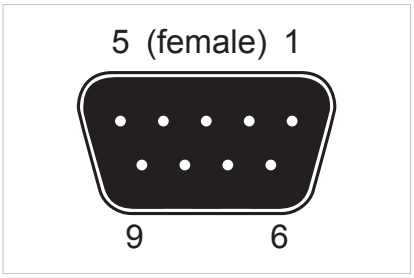


Fig. 11 D-sub connector

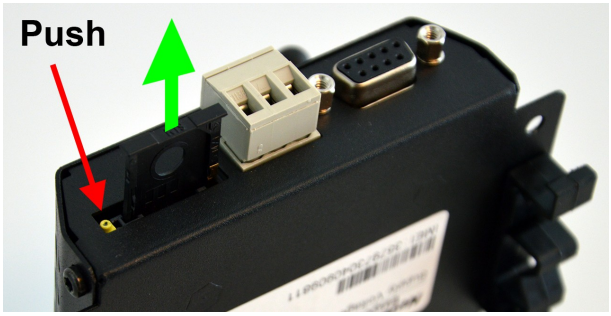
3.2.4 Antenna Connector

The antenna connector is a standard SMA screw connector. Optional external antennas are available from your supplier.

3.2.5 SIM Card

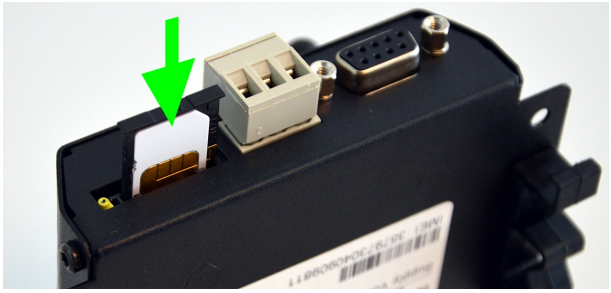
Installing the SIM Card

1. Push the yellow button next to the SIM card holder and remove the holder.



2. Place the SIM card into the holder. Observe the correct position of the cut-off corner and the contact surfaces.

3. Insert the SIM card holder with the SIM card.



SIM Card configuration

The SIM card must be configured in Netbiter Argos before it can be used.

When using a SIM card not issued by HMS, make sure that the SIM card has a mobile data plan and allows text messaging and that PIN code security has been disabled.

See the ***Netbiter Argos Administration Manual*** for further information.

3.3 Netbiter EC250

3.3.1 Terminal Block (12-pin)

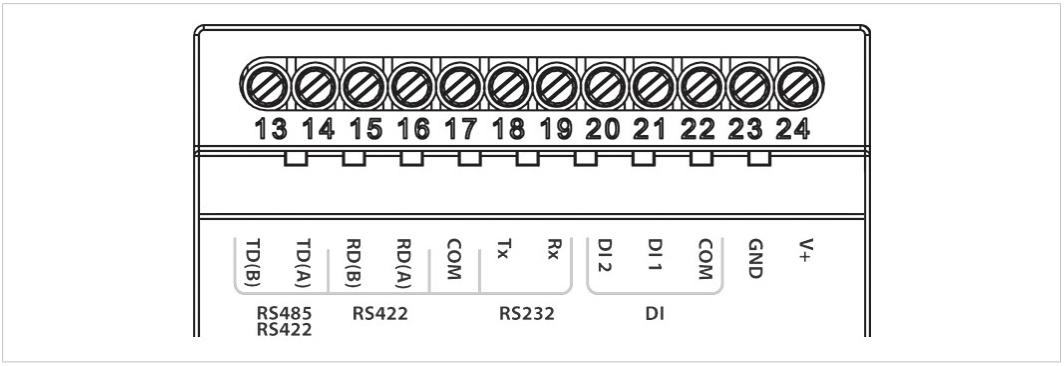


Fig. 12 Terminal block

Terminal block pin layout

Pin	Label	Function	Note
24	V+	Power 9–24 VDC	
23	GND	PE ground	
22	DI:COM	Digital input common	
21	DI:DI 1	Digital input #1	Low = 0–2 VDC, High = 10–24 VDC
20	DI:DI 2	Digital input #2	Low = 0–2 VDC, High = 10–24 VDC
19	RS-232:RX	RS-232 Receive	
18	RS-232:TX	RS-232 Transmit	
17	COM	Serial interface common	Shared between RS232/422/485
16	RS-422:RD(A)	RS-422 Receive A	
15	RS-422:RD(B)	RS-422 Receive B	
14	RS-485:TD(A) RS-422:TD(A)	RS-485 Line A RS-422 Transmit A	
13	RS-485:TD(B) RS-422:TD(B)	RS-485 Line B RS-422 Transmit B	

3.3.2 D-sub Connector

The 9-pin D-sub connector provides an RS-232 interface for Modbus RTU and for connecting a GPS receiver.

D-sub connector pin layout

Pin	Function
1	CD (Carrier Detect)
2	Rx (Receive)
3	Tx (Transmit)
4	DTR (Data Terminal Ready)
5	GND
6	DSR (Data Set Ready)
7	RTS (Request To Send)
8	CTS (Clear To Send)
9	RI (Ring Indicator)

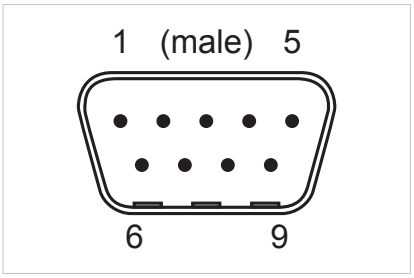


Fig. 13 D-sub connector

3.3.3 Ethernet Connector

The RJ-45 socket provides Ethernet network connection. It also supports Modbus TCP via Ethernet, which can be used at the same time as Modbus RTU units on another interface.

Ethernet connector pin layout

Pin	Function
1	TD+
2	TD-
3	RD+
4, 5, 7, 8	Termination
6	RD-

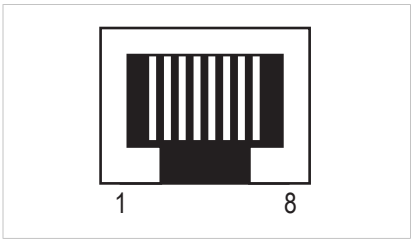


Fig. 14 Ethernet connector

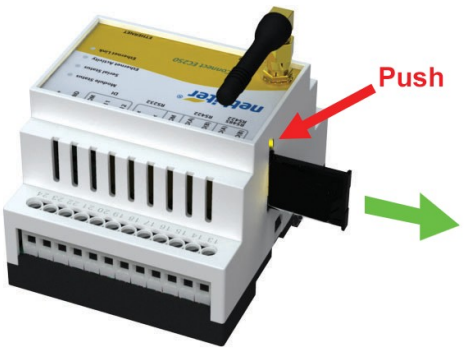
3.3.4 Antenna Connector

The antenna connector is a standard SMA screw connector. Optional external antennas are available from your supplier.

3.3.5 SIM Card

Installing the SIM Card

1. Push the yellow button next to the SIM card holder and remove the holder.



2. Place the SIM card into the holder. Observe the correct position of the cut-off corner and the contact surfaces.

3. Insert the SIM card holder with the SIM card.

SIM Card configuration

The SIM card must be configured in Netbiter Argos before it can be used.

When using a SIM card not issued by HMS, make sure that the SIM card has a mobile data plan and allows text messaging and that PIN code security has been disabled.

See the ***Netbiter Argos Administration Manual*** for further information.

3.4 Netbiter EC310/EC350

3.4.1 Terminal Block (11-pin)

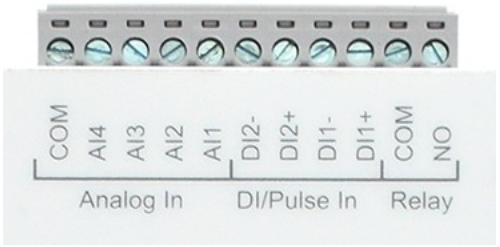


Fig. 15 Terminal block

Terminal block pin layout

Pin	Label		Function	Note
11	Analog In	COM	Analog Input Common	
10		AI4	Analog Input 4	0–20 mA or 0–10 VDC
9		AI3	Analog Input 3	0–20 mA or 0–10 VDC or PT100
8		AI2	Analog Input 2	0–20 mA or 0–10 VDC
7		AI1	Analog Input 1	0–20 mA or 0–10 VDC or PT100
6	DI/Pulse In	DI2-	Digital Input 2	Dry contact type
5		DI2+	Digital Input 2 current source	
4		DI1-	Digital Input 1	
3		DI1+	Digital Input 1 current source	
2	Relay	COM	Relay output common, isolated	Rated load: 1 A @ 24 VDC
1		NO	Relay output, NO, isolated	

The analog inputs can be configured in Netbiter Argos for either current, voltage or PT100 (temperature sensor).

The digital inputs are of the “dry contact” type which do not require any control voltage and will function with a switch or breaker.

Do not connect a power source to the digital inputs, as this may damage the unit.

The relay output must be supplied from an isolating transformer using a secondary listed fuse rated at maximum 3.3 A and minimum 30 VDC.

3.4.2 RS-485 Serial Interface (3-pin connector)

The RS-485 serial interface can be used to connect Modbus RTU devices.

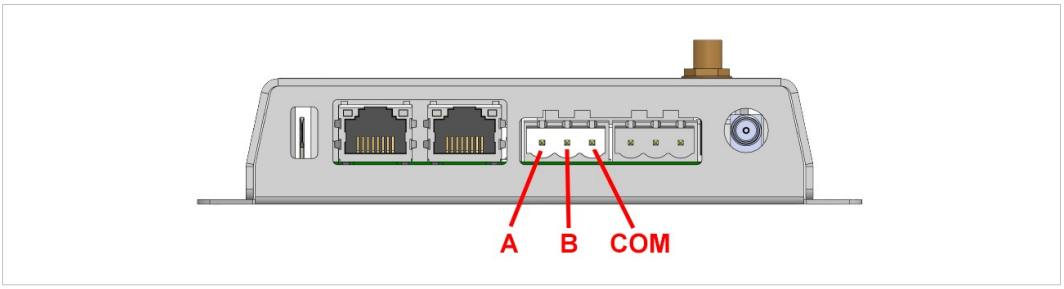


Fig. 16 RS-485 connector

RS-485 connector pin layout

Pin	Function
A	RS-485 A line
B	RS-485 B line
COM	RS-485 common

3.4.3 RS-232 Serial Interface (3-pin connector)

The RS-232 serial interface can be used to connect a single Modbus RTU device.

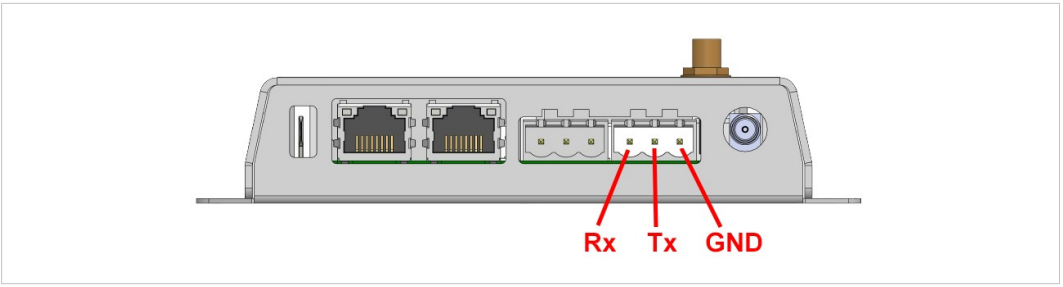


Fig. 17 RS-232 connector

RS-232 connector pin layout

Pin	Function
Rx	Receive (input)
Tx	Transmit (output)
GND	Signal ground

3.4.4 Ethernet Ports (RJ-45)

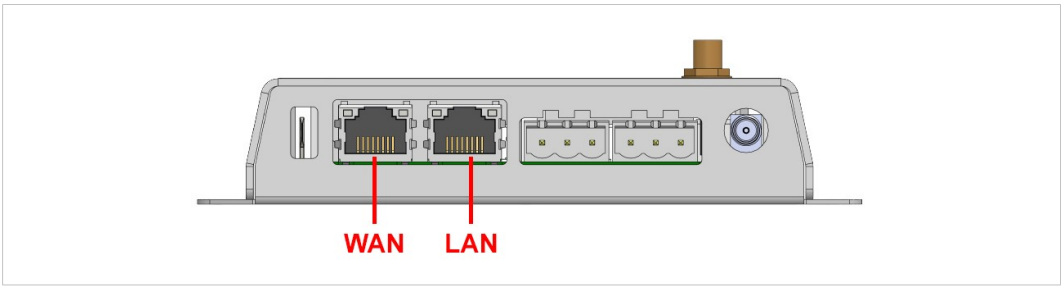


Fig. 18 Ethernet Ports

WAN	Used for connecting to the Internet and Netbiter Argos
LAN	Used for EtherNet/IP, Modbus TCP and Remote Access

> *Do not connect the LAN and WAN ports to the same logical network.*

Ethernet connector pin layout

Pin	Function
1	TD+
2	TD-
3	RD+
4, 5, 7, 8	Termination
6	RD-

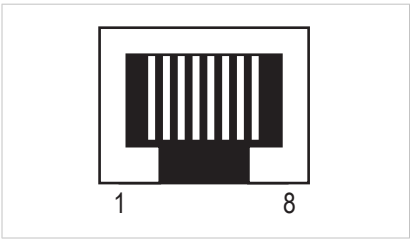


Fig. 19 Ethernet connector

3.4.5 USB Connector

The USB connector can be used to connect locally to the Netbiter EC310/350 for firmware upgrades, configuration and troubleshooting. See also *Select Login Method, p. 40*.

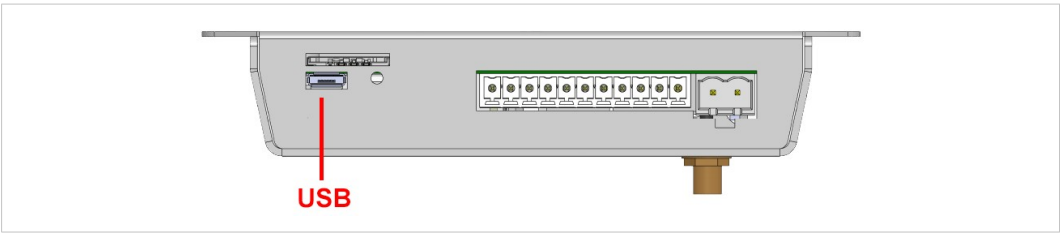


Fig. 20 USB connector

3.4.6 3G/GPRS and GPS Antenna Connectors (EC350)

The 3G/GPRS antenna connector on the front of the Netbiter EC350 is a standard female SMA screw connector. A stub antenna is supplied as standard[1], and optional external antennas are available from your supplier.

The Netbiter EC350 also has a built-in GPS receiver. An external GPS antenna (not included) should be connected to the female SMA screw connector on the underside of the unit. The connector also provides power for active GPS antennas.

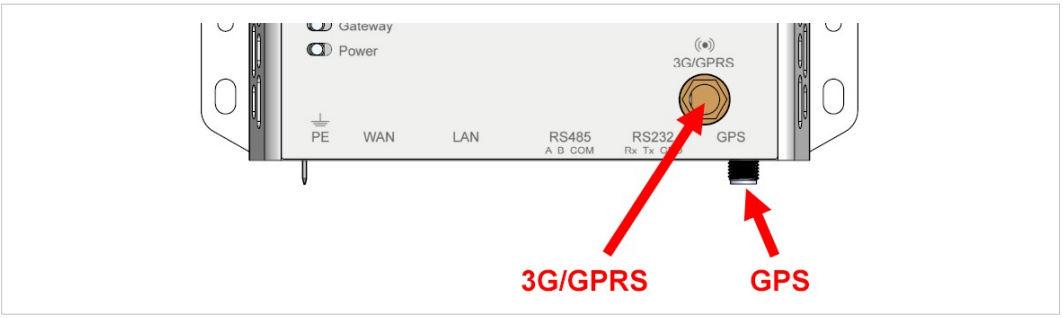


Fig. 21 EC350 antenna connectors

3.4.7 SIM Card (EC350)

The Netbiter SIM cards provided by HMS will load the correct network settings automatically and do not require configuration.

SIM cards not issued by HMS will require additional configuration in Netbiter Argos or in the local web pages. You must also make sure that the SIM card has a mobile data plan and allows text messaging, and that PIN code security has been disabled.

See the ***Netbiter Argos Administration Manual*** and/or *Modem Settings (EC350), p. 44* for further information.

Installing the SIM Card

1. Insert the SIM card carefully into the EC350 as shown in the figure. Observe the position of the cut-off corner and the contact surfaces.

> *When inserting the SIM card, make sure it does not accidentally slip behind the SIM card holder.*

2. Push the SIM card firmly downwards until it clicks into place.

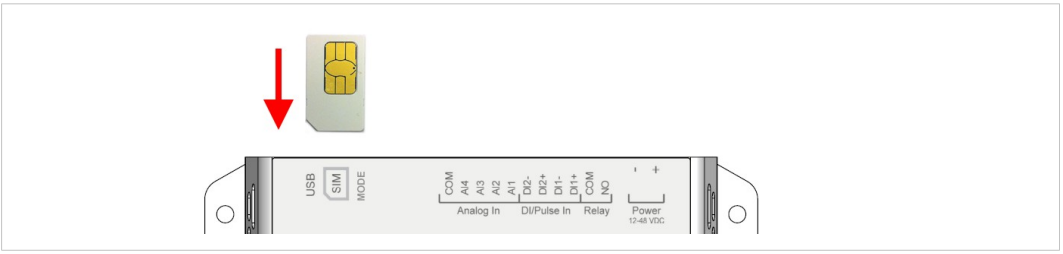


Fig. 22 Installing the SIM card

1. Antenna is not included when sold in the U.S.

3.5 Power Supply

> *Always make sure that the power supply is correctly connected and of the correct type. Connecting power with reverse polarity or using the wrong type of power supply may damage the unit.*

Netbiter EC150 and EC250

Fig. 23 EC150/EC250 power supply connection

Connect 9–24 VDC to **Vin+** (EC150) or **V+** (EC250), and connect ground to **GND**.

> *Netbiter EC150 can alternatively be powered by 9–24 VAC.*

Netbiter EC220

Fig. 24 EC220 power supply connection

Connect 9–24 VDC to **+VDC**, and connect ground to **GND**.

Netbiter EC310 and EC350

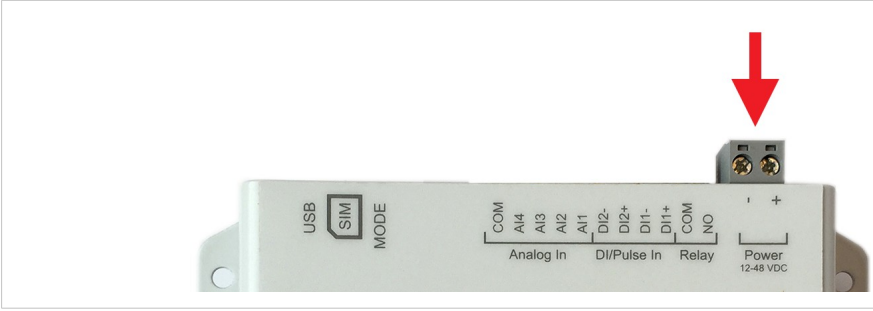


Fig. 25 EC310/EC350 power supply connection

Connect 12–48 VDC to **+** (plus), and connect ground to **-** (minus).

4 LED Indicators

4.1 Netbiter EC150

Fig. 26 EC150 LED indicators

LED Indication		Meaning
Module Status	OFF	No power
	Orange/green	System is starting up
	Green (3 flashes)	System is operating normally
	Red (2 flashes)	Invalid network settings • DHCP: Check that there is a working DHCP server on the network. • Static IP: Check that the IP address, default gateway and DNS are correctly set. • If a proxy is used, check that the proxy settings are correct.
	Red (3 flashes)	No connection to Netbiter Argos • Check the network settings. • If a proxy is used, check that the proxy settings are correct. • Check that at least one of ports 443, 80 or 5222 are open in the firewall.
Serial Link Status	Flashing green	Receiving serial packet
	Flashing red	Transmitting serial packet
Activity/Collision	Flashing green	Receiving Ethernet packet
	Flashing red	Ethernet collision
Link	Steady green	10 Mbps Ethernet network detected
	Steady orange	100 Mbps Ethernet network detected

4.2 Netbiter EC220

All LED indicators will be lit while the gateway is starting up. After the startup sequence has completed they will indicate system status.

Fig. 27 EC220 LED indicators

LED Indication		Meaning
Power	Off	No power
	Green (steady)	Unit has power
Status	Off	Normal operation
	Red (1 flash)	SIM card not registered on HMS Home Network[2] • Check that the SIM card is correctly inserted and undamaged and that PIN security is disabled. • Check that there is mobile network coverage for your operator.
	Red (2 flashes)	Invalid network settings • Check that the correct APN (Access Point Name) has been set in Netbiter Argos.
	Red (3 flashes)	No connection to Netbiter Argos • Check that the mobile network provider grants access to port 5222.
Running	Off	Contact Netbiter support
	Green (flashing)	Normal operation
GSM Signal	Off	Contact Netbiter support
	Green (1 flash)	Poor mobile network signal • Make sure the antenna is correctly installed and pointing upwards. • Try a different antenna placement. • Use an external antenna.
	Green (2 flashes)	Acceptable mobile network signal
	Green (3 flashes)	Good mobile network signal

2. The Netbiter SIM card will automatically try to connect to a network in the global HMS "home network" group of operators. A list of these network operators can be found at the Netbiter support website.

4.3 Netbiter EC250

Fig. 28 EC250 LED indicators

The Module Status LED alternates between displaying system status and mobile network signal strength for 2 seconds each in a 4-second cycle. If a mobile network connection has not been set up, the LED will stay unlit during the second part of the cycle.

LED Indication		Meaning
Module Status (1)	OFF	No power
	Orange/green	System is starting up (ca. 40 seconds)
	Red (1 flash)	SIM card not registered on HMS Home Network[3] • Check that the SIM card is correctly inserted and undamaged, and that PIN security is disabled. • Check that there is mobile network coverage for your operator
	Red (2 flashes)	Invalid network settings **Mobile** • Check that the correct APN (Access Point Name) has been set in Netbiter Argos. **Ethernet** • DHCP: Check that there is a working DHCP server on the network. • Static IP: Check that the IP address, default gateway and DNS are correctly set. • If a proxy is used, check that the proxy settings are correct.
	Red (3 flashes)	No connection to Netbiter Argos **Mobile** • Check that the mobile network provider grants access to port 5222. **Ethernet** • Check the network settings. • If a proxy is used, check that the proxy settings are correct. • Check that at least one of ports 443, 80 or 5222 are open in the firewall.
Module Status (2)	Green (1 flash)	Poor mobile network signal • Make sure the antenna is correctly installed and pointing upwards. • Try a different antenna placement. • Use an external antenna.
	Green (2 flashes)	Acceptable mobile network signal
	Green (3 flashes)	Good mobile network signal
Serial Status	Steady orange	System is starting up
	Flashing green	Receiving serial packet
	Flashing red	Transmitting serial packet
Ethernet Activity	Flashing green	Receiving Ethernet packet
Ethernet Link	Steady green	10 Mbps Ethernet network detected
	Steady orange	100 Mbps Ethernet network detected

3. The Netbiter SIM card will automatically try to connect to a network in the global HMS "home network" group of operators. A list of these network operators can be found at the Netbiter support website.

4.4 Netbiter EC310

Fig. 29 EC350 LED indicators

LED Indication		Meaning
RS485/RS232	Off	Port not in use
	Red (steady)	Port failure – contact Netbiter support
	Green (steady)	Port enabled in Netbiter Argos
Uplink/WAN	Red (steady)	Incorrect IP address settings • DHCP: Check for a working DHCP server on the network. • Static IP: Check that the IP address, default gateway and DNS are correctly set.
	Red (flashing)	No connection to Netbiter Argos • Check your network settings. • Check that port 443 is open in the firewall.
	Green (steady)	Connected to Netbiter Argos
Gateway	Off	No power, or unit is starting up
	Red (steady)	Hardware failure – contact Netbiter support
	Red (flashing)	Application failure – contact Netbiter support
	Green (flashing)	Firmware update in progress
	Green (steady)	Unit is operational
Power	Off	No power
	Green (steady)	Unit has power

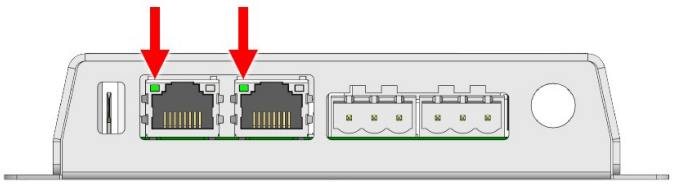


Fig. 30 Ethernet Link LEDs

LED Indication	Meaning
Off	No Ethernet traffic
Orange (flashing)	Activity on 10 Mbit/s network
Green (flashing)	Activity on 100 Mbit/s network

4.5 Netbiter EC350

All LED indicators will light up while the gateway is starting up. After the startup sequence has completed they will indicate system status.

Pressing and releasing the **MODE** button will temporarily change the function of the top 5 LED indicators to show the strength of the mobile network signal. After 60 seconds the indicators will revert to the default mode (system status).

Fig. 31 EC350 LED indicators

System Status (default mode)

LED Indication		Meaning
RS485/RS232	Off	Port not in use
	Red (steady)	Port failure – contact Netbiter support
	Green (steady)	Port enabled in Netbiter Argos
Uplink/WAN	Red (steady)	Incorrect IP address settings • DHCP: Check for a working DHCP server on the network. • Static IP: Check that the IP address, default gateway and DNS are correctly set.
	Red (flashing)	No connection to Netbiter Argos • Check your network settings. • Check that port 443 is open in the firewall.
	Green (steady)	Connected to Netbiter Argos
Modem	Off	Modem disabled
	Red (steady)	Modem failure – contact Netbiter support
	Red (flashing)	SIM card failure • Check that the SIM card is correctly inserted and undamaged.
	Orange (steady)	PIN code is activated for the SIM card • Disable the PIN code on the SIM card.
	Orange (flashing)	APN (Access Point Name) not set
	Green (flashing)	Searching for mobile network
	Green (steady)	Connected to mobile network
Gateway	Off	No power, or unit is starting up
	Red (steady)	Hardware failure – contact Netbiter support
	Red (flashing)	Application failure – contact Netbiter support
	Green (flashing)	Firmware update in progress
	Green (steady)	Unit is operational
Power	Off	No power
	Green (steady)	Unit has power

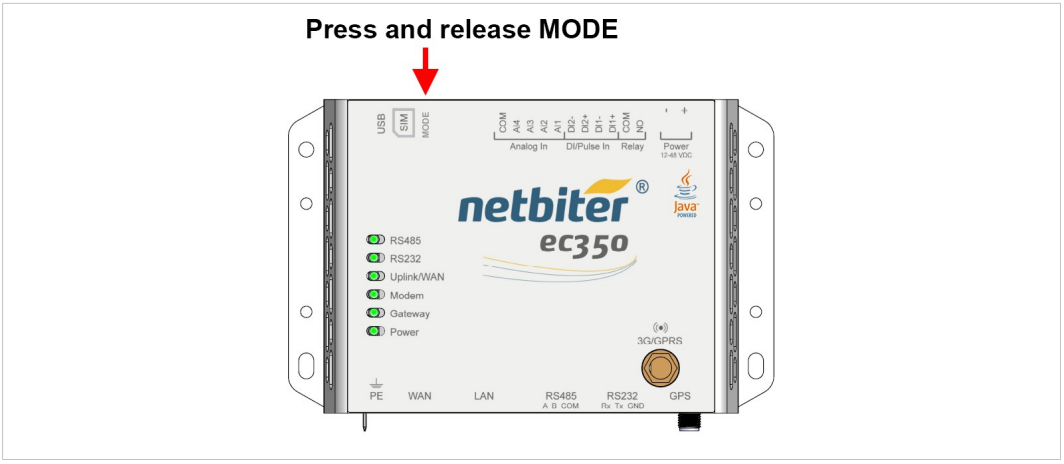


Fig. 32 EC350 LED indicators and mode switch

Signal Strength (shown for 60 seconds when MODE switch is pressed)

LED indication	Meaning
1 red LED (flashing)	No/unknown signal
1 orange LED (flashing)	Poor mobile network signal • Make sure the antenna is correctly installed and pointing upwards. • Try a different antenna placement. • Use an external antenna.
1 green LED (flashing)	Acceptable mobile network signal
2–5 green LEDs (flashing)	Good to optimum mobile network signal

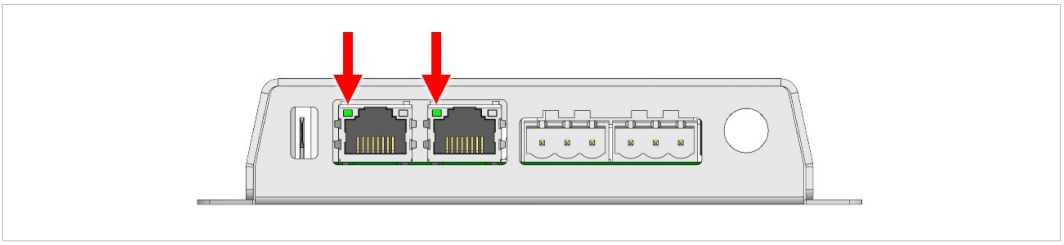


Fig. 33 Ethernet Link LEDs

LED Indication	Meaning
Off	No Ethernet traffic
Orange (flashing)	Activity on 10 Mbit/s network
Green (flashing)	Activity on 100 Mbit/s network

5 Wiring Examples

5.1 Netbiter EC150/EC250

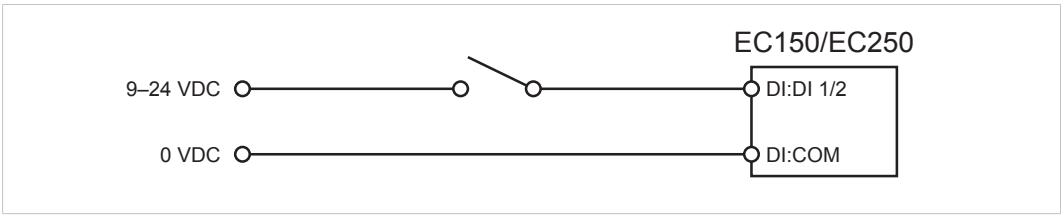


Fig. 34 Digital Input

5.2 Netbiter EC220

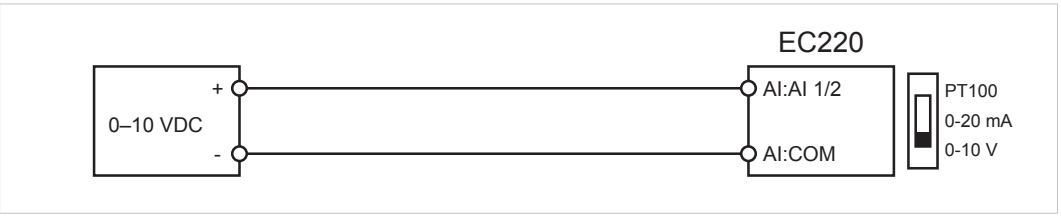


Fig. 35 Analog Input – Voltage Sensor

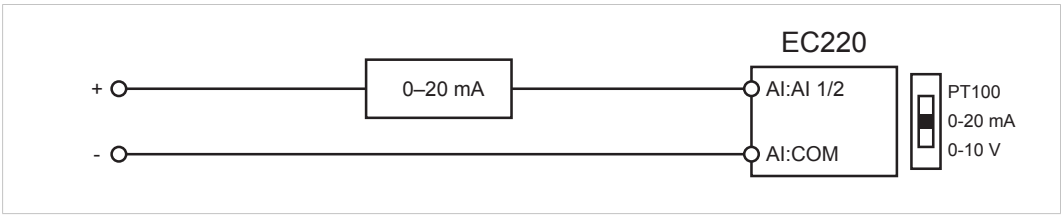


Fig. 36 Analog Input – 2-wire Current Sensor

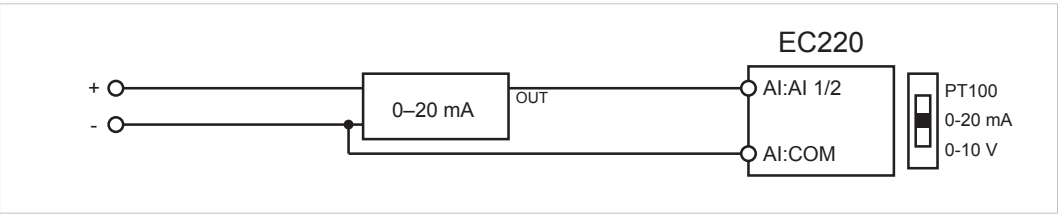


Fig. 37 Analog Input – 3-wire Current Sensor

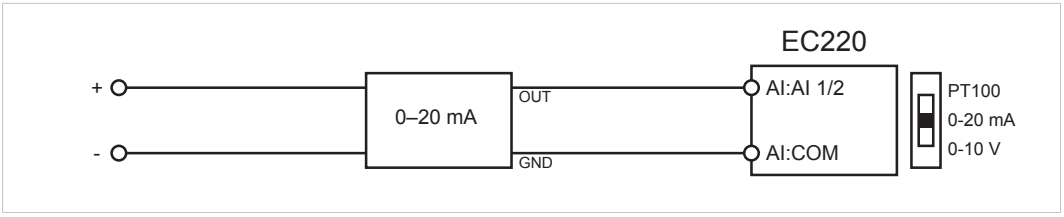


Fig. 38 Analog Input – 4-wire Current Sensor

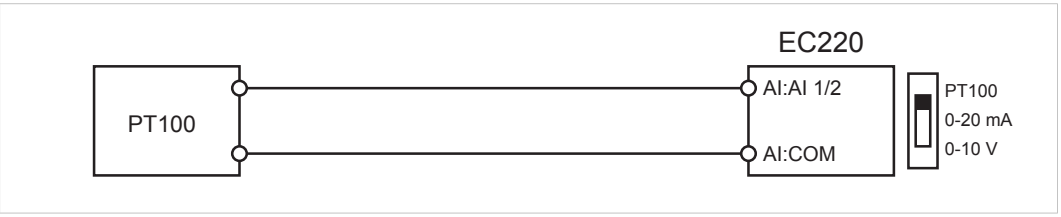


Fig. 39 Analog Input – Temperature Sensor

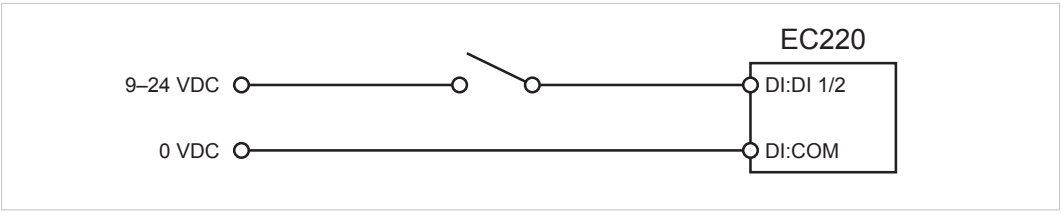


Fig. 40 Digital Input

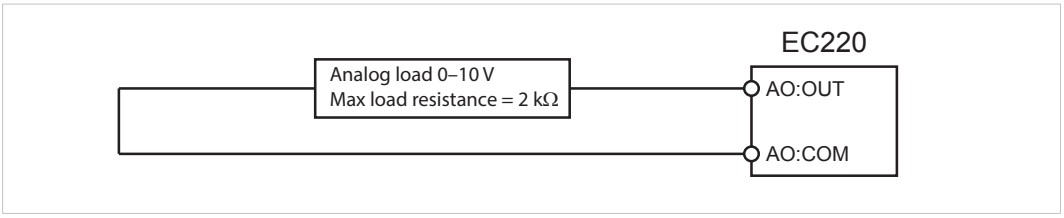


Fig. 41 Analog Output

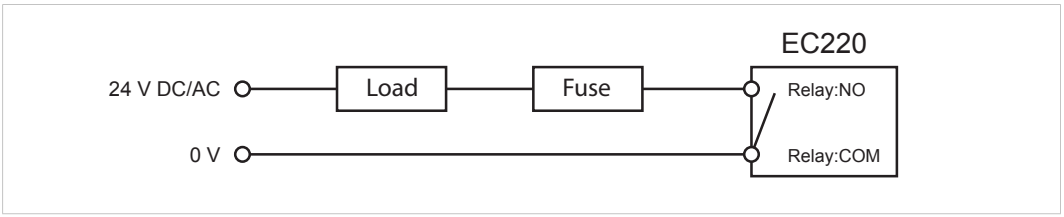


Fig. 42 Relay Output

The relay output must be supplied from an isolating transformer using a secondary listed fuse rated at maximum 3.3 A and minimum 30 VDC.

5.3 Netbiter EC310/EC350

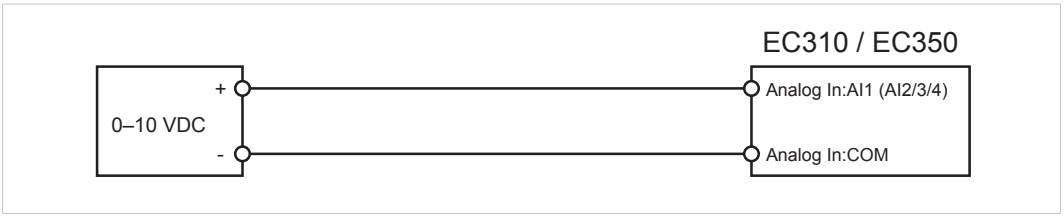


Fig. 43 Analog Input – Voltage Sensor

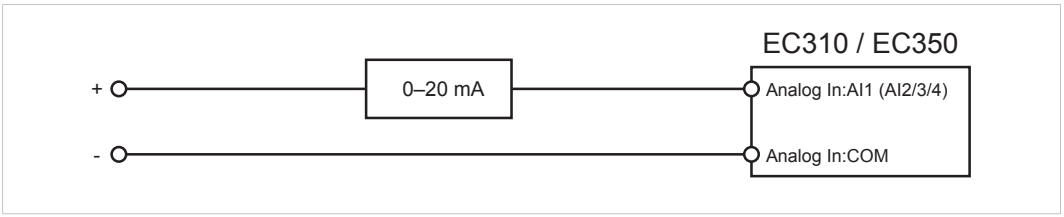


Fig. 44 Analog Input – 2-wire Current Sensor

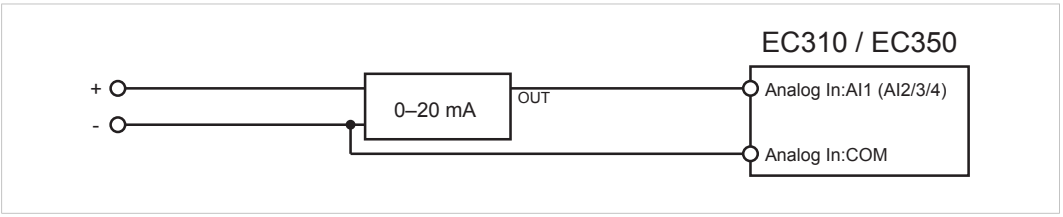


Fig. 45 Analog Input – 3-wire Current Sensor

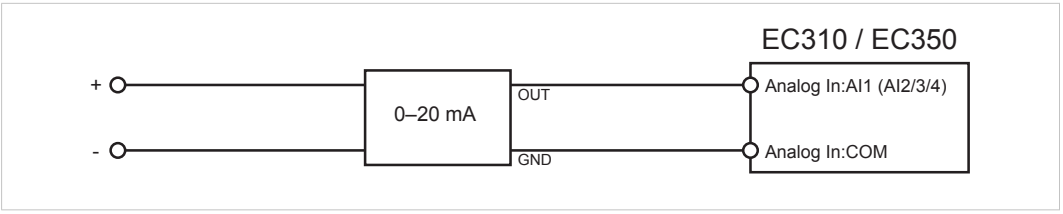


Fig. 46 Analog Input – 4-wire Current Sensor

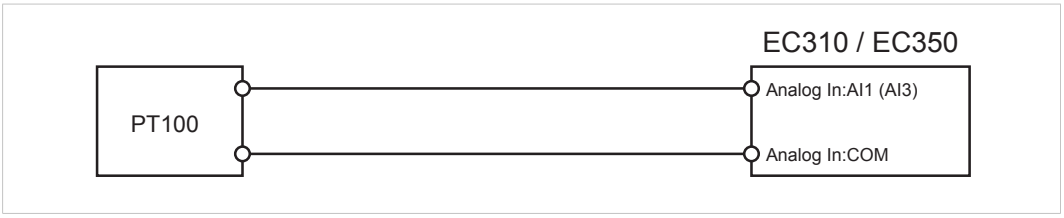


Fig. 47 Analog Input – Temperature Sensor

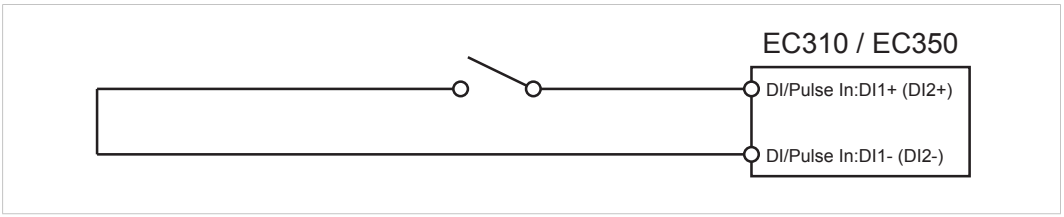


Fig. 48 Digital Input

Do not connect a power source to the digital inputs on a Netbiter EC310/EC350 as this may damage the unit.

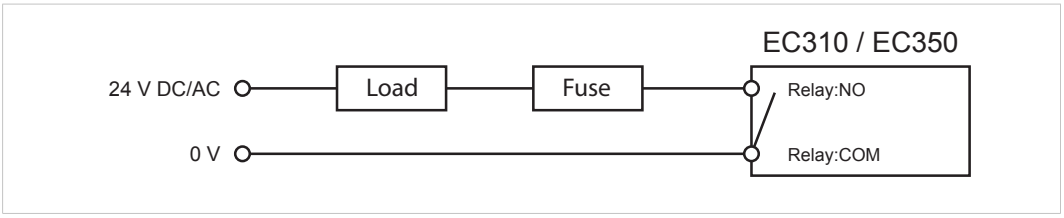


Fig. 49 Relay Output

The relay output must be supplied from an isolating transformer using a secondary listed fuse rated at maximum 3.3 A and minimum 30 VDC.

6 GPS

6.1 Connecting GPS Devices

6.1.1 Netbiter EC220

Connecting a GPS device to a Netbiter EC220 requires a cable with a 9-pin **male** D-sub connector to connect to the RS-232 port.

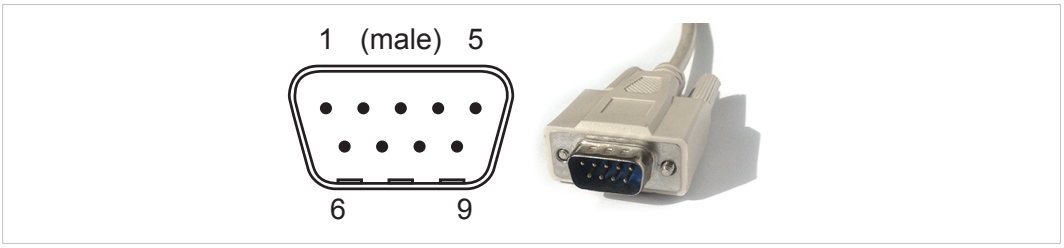


Fig. 50 D-sub connector

GPS cable pin assignment

EC220 RS-232 port		GPS device
2	Rx (Receive)	Tx
3	Tx (Transmit)	Rx
5	GND	GND

6.1.2 Netbiter EC250

Connecting a GPS device to a Netbiter EC250 requires a cable with a 9-pin **female** D-sub connector to connect to the RS-232 port.

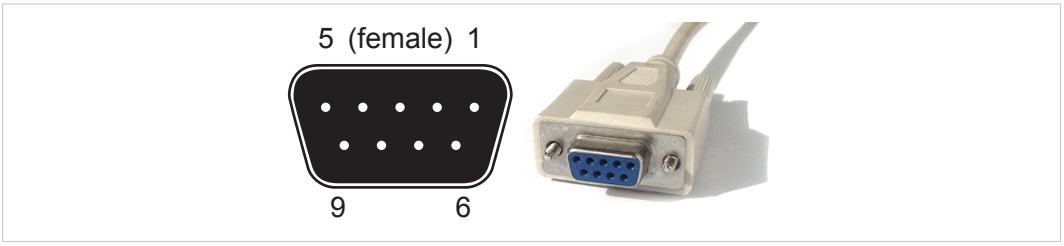


Fig. 51 D-sub connector

GPS cable pin assignment

EC250 RS-232 port		GPS device
2	Rx (Receive)	Tx
3	Tx (Transmit)	Rx
5	GND	GND

6.1.3 Netbiter EC350

The Netbiter EC350 has a built-in GPS receiver. To use the GPS function, connect a suitable GPS antenna (not included) to the unit.

6.2 Activating the GPS function

GPS functionality must be activated in Netbiter Argos before it can be used. See the ***Netbiter Argos Administration Manual*** for more information.

7 Ethernet Network Setup

> *Netbiter EasyConnect gateways should only be installed in networks with firewall protection. Contact your network administrator if in doubt.*

Netbiter EasyConnect gateways require outbound (outgoing) access on the TCP ports listed below to connect to Netbiter Argos.

Ports used to connect to Netbiter Argos

Netbiter model	TCP ports
EC310, EC350	443
EC150, EC250	5222, 443, 80

Connection attempts will be made to 3 different servers with a timeout of 30 seconds each. This means that it may take up to 4 min 30 sec to establish a connection for EC150/220/250 (3 ports x 3 servers x 30 seconds).

The following ports may also need to be opened in the firewall:

502	Default port for Modbus TCP
8080	Extra web server

7.1 Static/Dynamic IP Addressing

When using static IP addressing the network settings are configured using the *IPconfig* utility. See *IP Configuration, p. 31*.

When using DHCP (the default setting), there is no need to configure any of the IP address related settings.

If the network uses a proxy to connect to the Internet you also need to set up the proxy configuration in the local configuration web interface. See *Local Configuration, p. 34*.

7.2 IP Configuration

7.2.1 Installing the IPconfig Utility

IPconfig is a Windows-based configuration utility for TCP/IP network settings in Netbiter gateways. It detects connected Netbiter gateways and lets the user set the IP address, netmask, default gateway, DNS and hostname for each unit.

1. Download IPConfig from www.netbiter.com/support.
2. Extract the contents of the zip archive in a folder on your computer and double-click the executable file to run it.

7.2.2 Scanning for Connected Devices

Make sure that the Netbiter gateways to be installed are connected on the same Ethernet subnet as the computer running IPconfig. Use standard Ethernet cables.

When the IPconfig utility is started it will scan the Ethernet network for Netbiter gateways. All detected units will be presented in a list in the main window. To refresh the list, click on **Scan**.

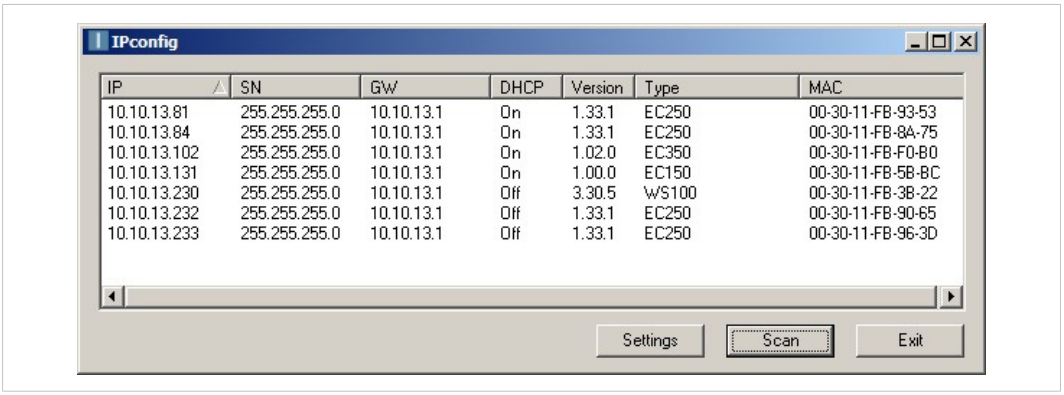


Fig. 52 IPconfig main window

Main window columns

IP	IP address of the Netbiter gateway
SN	Subnet mask
GW	Default gateway
DHCP	Automatically managed IP configuration
Version	Firmware version
Type	Netbiter model name
MAC	Ethernet MAC address (System ID)

7.2.3 Changing IP settings

To change the IP settings for a unit in the list, either double-click on it or select it and click on **Settings** to open the configuration window.

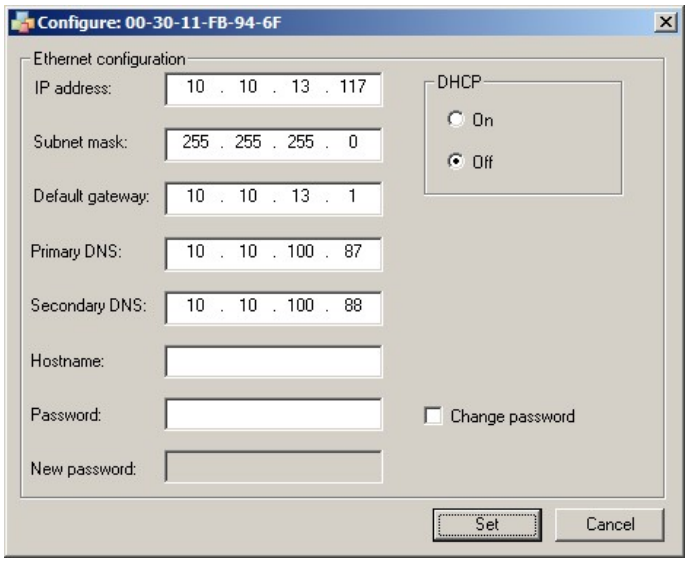


Fig. 53 IPConfig settings

Notes

- Do not enable DHCP if there is no DHCP server available on the network.
- You can add a name for the Netbiter gateway in the **Hostname** field. Only characters a-z, A-Z, 0–9 and _ (underscore) are allowed.
- The default password for authentication of the new settings is *admin* for Netbiter EC150, EC250, and WS series gateways. For Netbiter EC300 series gateways the default password is the activation code.

  To change the password, check the **Change password** box and enter the current password in the **Password** field and the new password in the **New password** field, then click on **Set**.

For security reasons, the password "admin" should always be changed.

*Changing the password in IPconfig will **not** affect the password for logging in to the local configuration pages.*

Click **Set** to save the new settings and restart the Netbiter gateway. Please note it that may take some time before the gateway is online again after a reboot.

8 Activation

8.1 Adding the Gateway to Netbiter Argos

Before a Netbiter EasyConnect gateway can be used it must be registered and activated from a user account in Netbiter Argos.

For instructions on how to add a Netbiter gateway to Netbiter Argos, please refer to the ***Netbiter Argos Administration Manual*** which can be downloaded from the Netbiter support website www.netbiter.com/support.

Fig. 54 Netbiter Argos

9 Local Configuration

> *Local configuration is normally not required and should only be carried out when necessary. Please read the instructions below carefully.*

All Netbiter EasyConnect gateways except EC220 contain a built-in local web server that can be used for initial configuration and troubleshooting.

Netbiter Argos is the preferred way of configurating the gateway and should be used whenever possible. The only settings that should be made using the local web pages are:

- Proxy settings (if required)
- Modem/Ethernet connection mode (EC250/EC350 only)
- PIN code settings – if using a PIN code for the SIM card (EC250 only)

9.1 Connecting to the Web Server

The PC used to access the local configuration must be on the same Ethernet network subnet as the gateway. The PC can also be connected directly to the gateway using a crossover Ethernet cable. This may require the IP address for the Ethernet interface on the PC to be changed.

To connect to the web server in the Netbiter gateway, use the *IPconfig* utility to detect the IP address of the gateway, see *IP Configuration, p. 31*.

Right-click on the gateway in IPconfig and select **Open Web Interface** to open its local web server in your default browser. You can also type the IP address directly into the web browser address field.

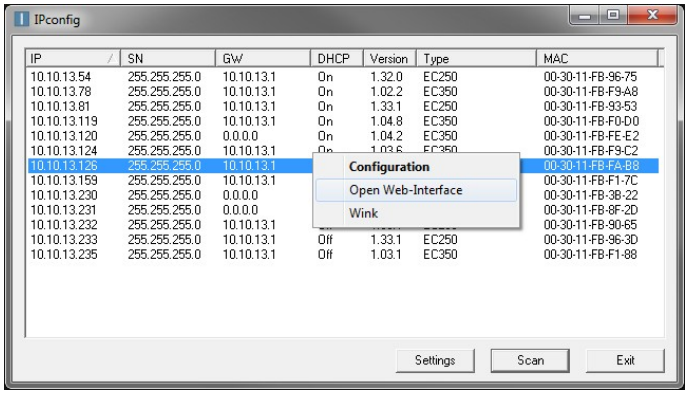


Fig. 55 IPconfig

Netbiter EC310 and EC350 also have a USB port that can be used for accessing the local web server, see *Select Login Method, p. 40*.

9.2 Netbiter EC150/EC250

9.2.1 Login

Enter the IP address of the gateway in a web browser to log in. The default user name is *admin*, and the password is the activation code supplied with the unit.

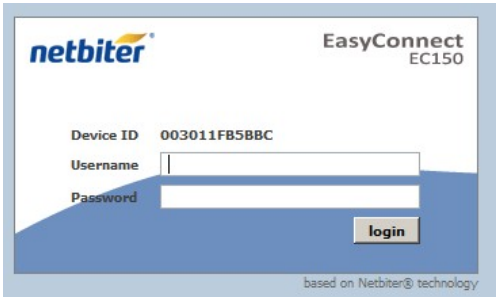


Fig. 56 Local web server login

The only changes that should be made locally are the settings for the network connection, modem settings (EC250) and firmware updates. All other settings are provided for troubleshooting and information purposes only and will not be synchronized with Netbiter Argos.

9.2.2 Status

The **Status** page presents an overview of the current connection status.

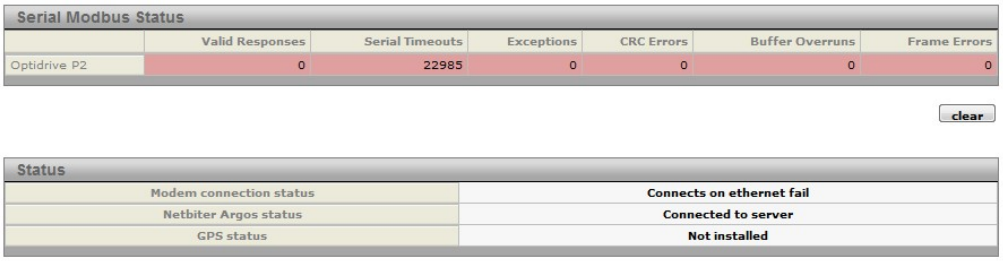


Fig. 57 Status page

9.2.3 Modbus Settings

Settings for Modbus communication. These settings should normally be made in Netbiter Argos. See the ***Netbiter Argos Administration Manual*** for more information.

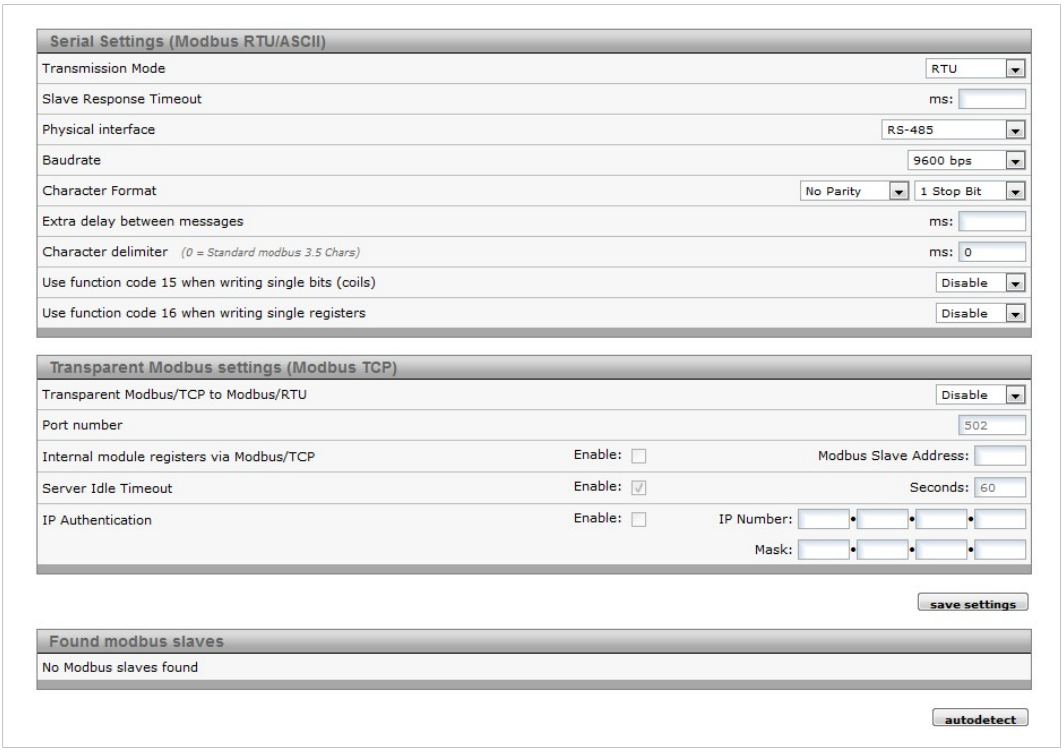


Fig. 58 Modbus Settings

9.2.4 Ethernet Settings

Fig. 59 Ethernet settings

These are the same settings as those entered in IPconfig, see *IP Configuration, p. 31*.

When DHCP is enabled the unit will automatically receive the settings for IP address, subnet mask, default gateway, and DNS. Contact your network administrator if in doubt.

9.2.5 System Settings

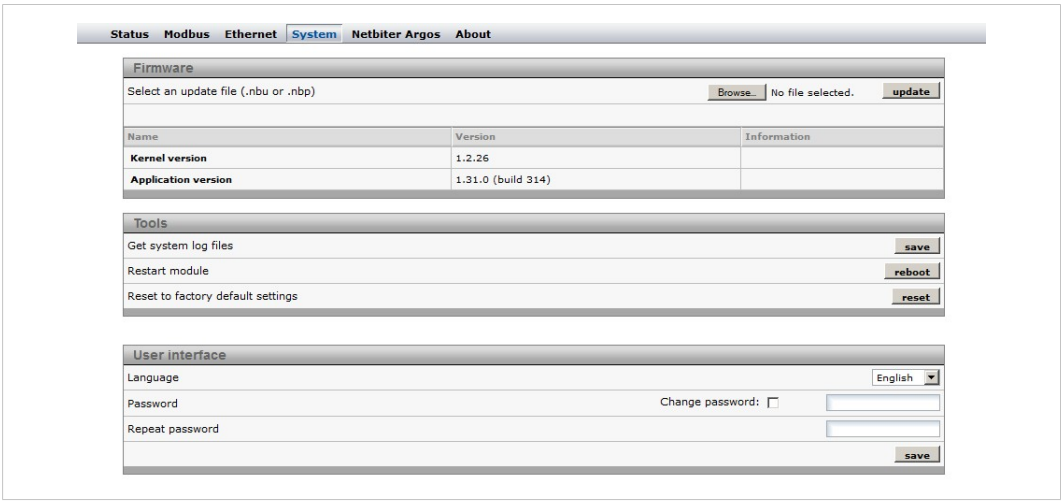


Fig. 60 System settings

This page is mainly used when updating the firmware in the unit.

Updating Firmware

1. Download the latest firmware from www.netbiter.com/support.
2. Click on **Browse** and select the firmware file you downloaded.
3. Click on **Update** to start the update.

> *Do not close the web page while the update is in progress.*

The firmware in Netbiter EC150 and EC250 can alternately be uploaded via the RS-232 serial interface. See *Netbiter Update (EC150/EC250), p. 45*.

9.2.6 Netbiter Argos

This page contains settings for connecting to Netbiter Argos and shows the status of the connection.

Proxy Setup

If you are connecting to the Internet via a proxy, select the proxy type in the drop-down menu **Use proxy to connect to Internet** and fill in the IP address, the port number to use on the LAN side, and (if required) the username and password for the proxy server.

Click on **Save settings** when finished.

Fig. 61 Netbiter Argos and proxy configuration

WAN Ports

The proxy server must allow traffic on at least one of the following ports:

- Port 443
- Port 80
- Port 5222

> *If none of the ports listed above are open on the WAN side, the gateway will not be able to communicate with Netbiter Argos.*

9.2.7 Modem Settings (EC250)

Fig. 62 Modem settings

If you are using a SIM card with PIN code security activated, click on **Enable** and enter the PIN code (provided by the card supplier). To test the PIN code, click on **Test PIN**.

> *This setting will **not** enable/disable PIN code security or change the PIN code on the SIM card. To do that, install the SIM card in a mobile phone and follow the instructions from the manufacturer.*

GPRS/Ethernet Failover Settings

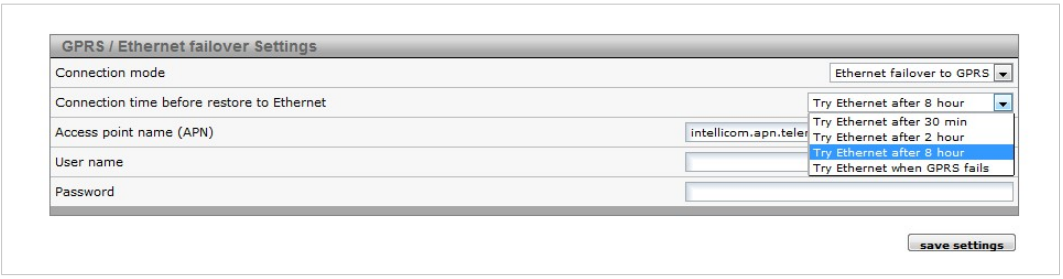


Fig. 63 GPRS/Ethernet failover settings

Netbiter EC250 can be set to temporarily switch to mobile networking if Ethernet fails.

Connection mode	**GPRS only**: Ethernet disabled (default mode) **Ethernet failover to GPRS**: Unit will automatically switch to GPRS if Ethernet connection is lost **Ethernet only**: GPRS modem disabled
Connection time before restore to Ethernet	Sets the time before the gateway should retry the Ethernet connection after a failover to GPRS. The cycle will be repeated until Ethernet communication has been reestablished.
Access point name (APN)	The identifying name used to connect to a mobile network. This information is supplied by the network operator for the SIM card.
User name/Password	Required by some mobile network operators.

Click on **Save settings** when finished.

9.2.8 GPS Settings (EC250)

Settings for communication with an external GPS device. These settings should normally be made in Netbiter Argos. See the ***Netbiter Argos Administration Manual*** for more information.

9.3 Netbiter EC310/EC350

9.3.1 Select Login Method

Netbiter EC310 and EC350 provide local access via either Ethernet or USB cable.

USB Connection

Connect a USB Micro B cable between the computer and the Netbiter EC310/EC350. After the USB device driver has been installed a virtual network card will automatically be created, with an IP address in the range 169.254.200.xxx. The local configuration pages of the gateway can now be accessed by entering the IP address **169.254.200.200** in a web browser.

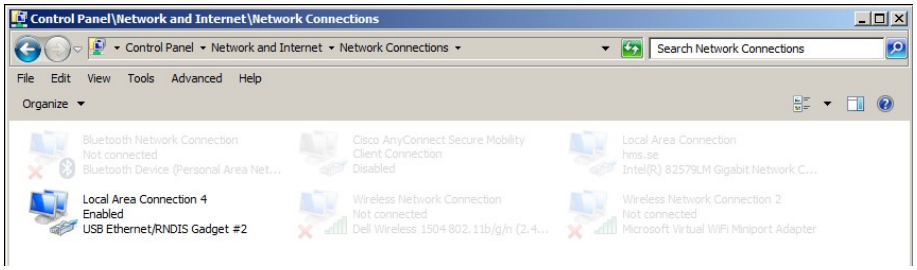


Fig. 64 Network Connections

Ethernet Connection

Connect an Ethernet cable to the **WAN** socket on the Netbiter EC310/350.

See *IP Configuration, p. 31* on how to find out the IP address of the Netbiter gateway.

9.3.2 Login

Enter the IP address of the gateway in a web browser to log in. The default user name is *admin*, and the password is the activation code supplied with the unit.

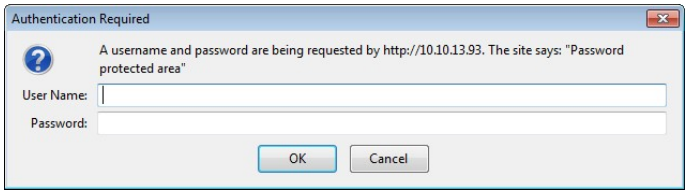


Fig. 65 Local configuration web server login

The only changes that should be made locally are the settings for the network connection, modem settings, and firmware updates. All other settings are provided for troubleshooting and informational purposes only and will not be synchronized with Netbiter Argos.

9.3.3 Status

The **Status** tabs present the current configuration and connection status.

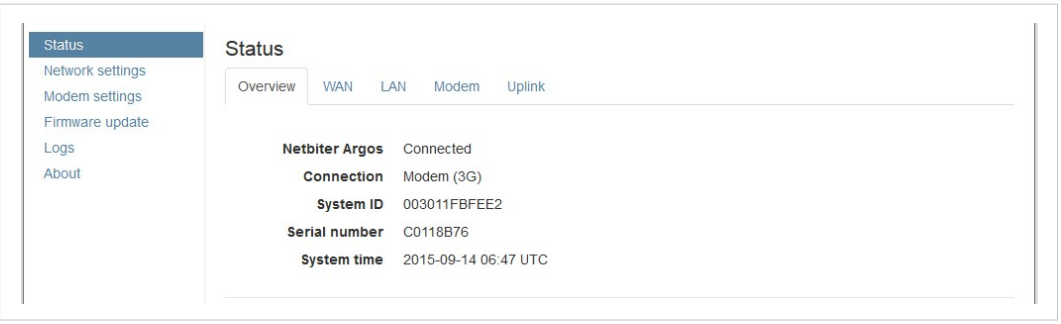


Fig. 66 Status – Overview

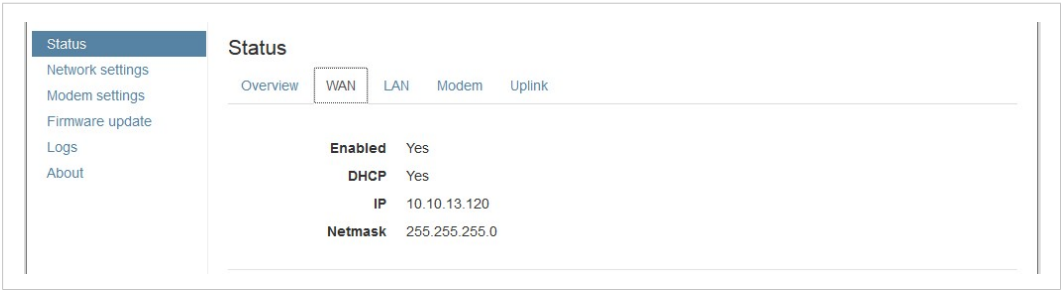


Fig. 67 Status – WAN

Fig. 68 Status – LAN

Fig. 69 Status – Modem

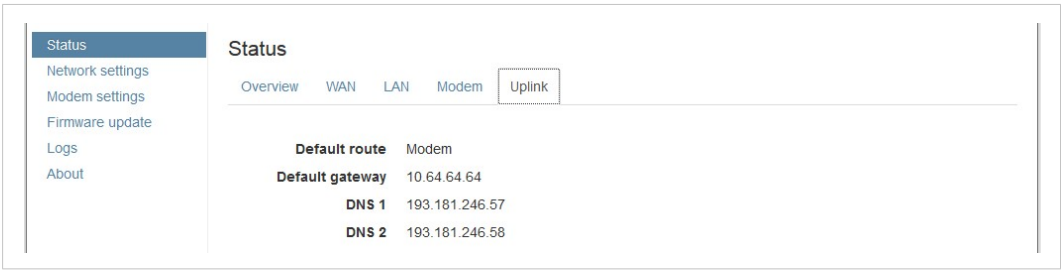


Fig. 70 Status – Uplink

9.3.4 Network Settings – WAN

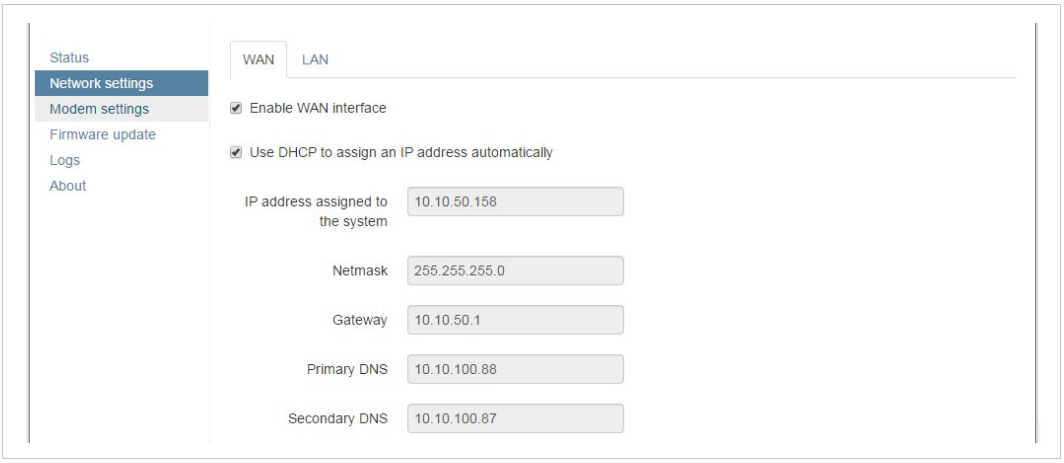


Fig. 71 WAN settings

The **WAN** interface should be enabled when connecting to Netbiter Argos via Ethernet. The settings are the same as those entered in IPconfig, see *IP Configuration, p. 31*.

When DHCP is enabled the unit will automatically receive the settings for IP address, subnet mask, default gateway, and DNS. Contact your network administrator if in doubt.

Proxy Settings

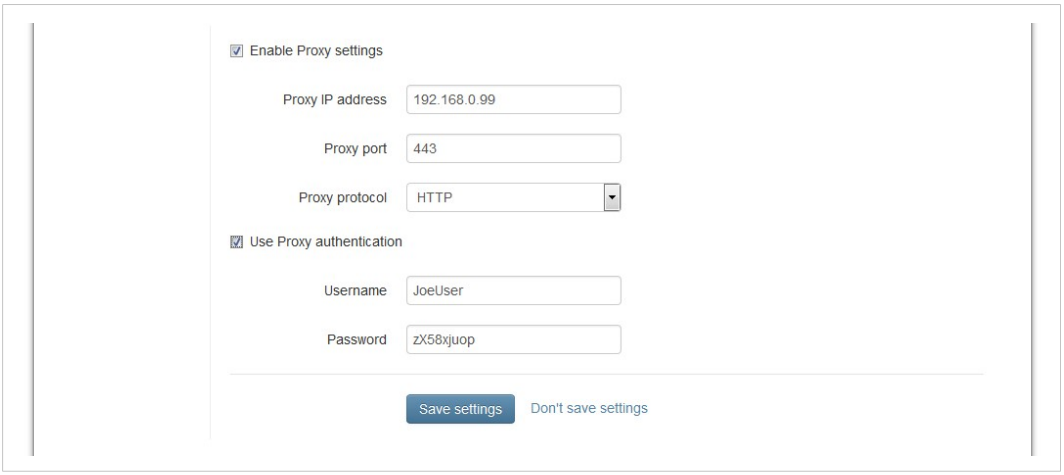


Fig. 72 Proxy settings

If you are connecting to the Internet via a proxy, check the box **Enable Proxy settings**, select the proxy type in the drop-down menu **Proxy protocol** and fill in the IP address and the port number to use for the proxy server.

If the proxy requires authentication, check the box **Use Proxy authentication** and fill in the username and password.

Click on **Save settings** when finished.

For information about the supported proxy types, see *Specifications, p. 56*.

9.3.5 Network Settings – LAN

The LAN interface must be enabled when using EtherNet/IP or Modbus TCP applications and when using the Netbiter Remote Access service.

These settings can also be made in Netbiter Argos. See the ***Netbiter Argos Administration Manual.***

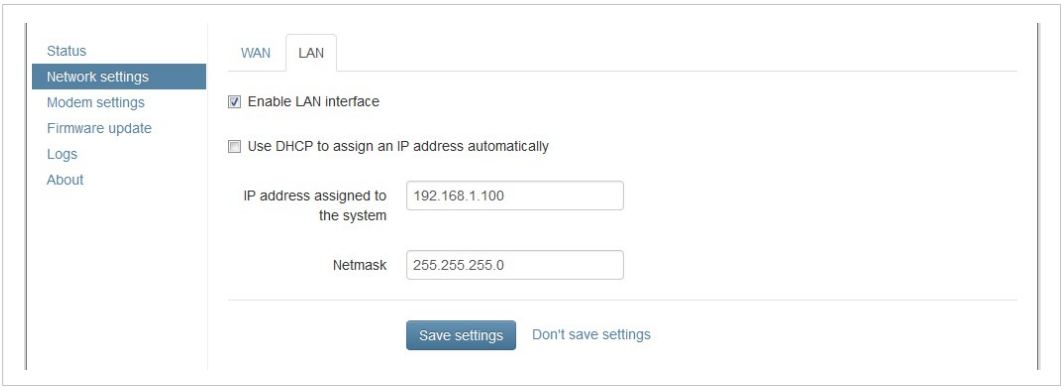


Fig. 73 LAN settings

> *Do not connect the LAN and WAN ports to the same logical network.*

Click on **Save settings** when finished.

9.3.6 Firmware Update

Firmware updates can also be made through Netbiter Argos. See the ***Netbiter Argos Administration Manual.***

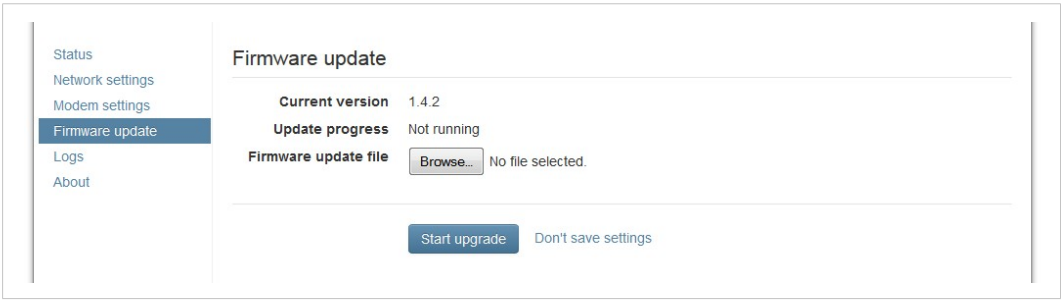


Fig. 74 Firmware update

> *The Netbiter gateway must be connected to the Internet to ensure that the internal clock has synchronized the time and date before updating the firmware.*

1. Download the latest firmware from www.netbiter.com/support.
2. Click on **Browse** and select the firmware file you downloaded.
3. Click on **Start upgrade** to start the update.

> *Do not close the web page while the update is in progress.*

9.3.7 Modem Settings (EC350)

Modem settings and information about the mobile connection.

These settings can also be made in Netbiter Argos. A SIM card with SMS capability is required. See the ***Netbiter Argos Administration Manual.***

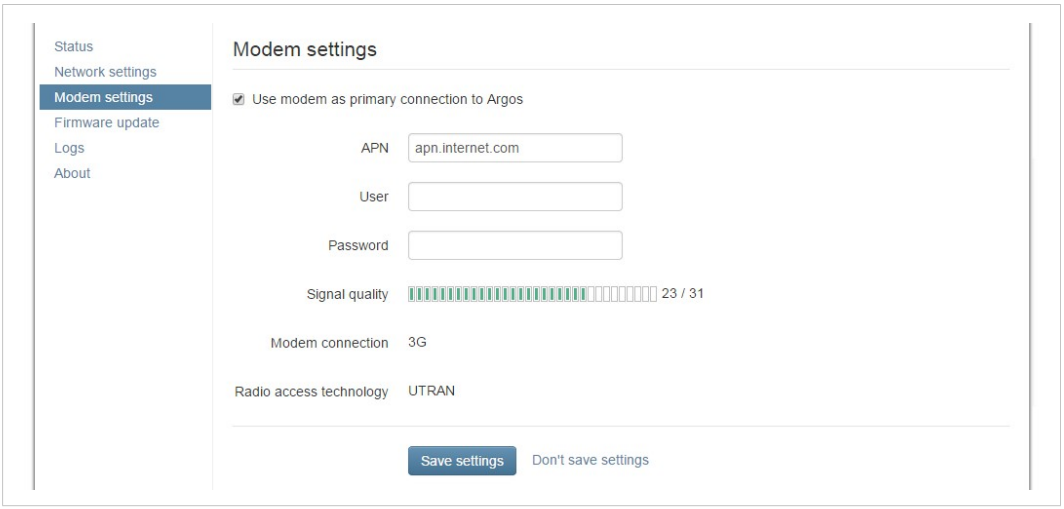


Fig. 75 Modem settings (EC350)

Use modem as primary connection to Argos	When enabled, mobile networking will be used as default as long as the signal strength is adequate. If the WAN interface is also enabled the gateway will automatically switch to Ethernet networking if mobile communication is interrupted.
APN	The APN (Access Point Name) is the identifier for the mobile network. The APN is supplied by the network operator for the SIM card.
User/Password	Required by some mobile network operators.

Click on **Save settings** when finished.

SIM cards with active PIN code security cannot be used in Netbiter EC350. The PIN code cannot be disabled here or in Netbiter Argos. Install the SIM card in a mobile phone and follow the instructions from the manufacturer to disable the PIN code.

10 Netbiter Update (EC150/EC250)

The easiest way to update firmware is via Netbiter Argos, with the local configuration pages as a backup option if Netbiter Argos cannot be used. The firmware for Netbiter EC150 and EC250 can also be uploaded via the RS-232 serial (D-sub) interface using a free Windows-based software tool, *Netbiter Update*.

Updating Firmware with Netbiter Update

Requirements

- Null modem cable
- Computer with RS-232 serial interface (COM port)

1. Download Netbiter Update from www.netbiter.com/support.
2. Connect a null modem cable between the serial port on the computer and the D-sub connector on the Netbiter gateway.
3. Start Netbiter Update. The COM port should already be selected. Leave the **Baudrate** setting at **Auto**.

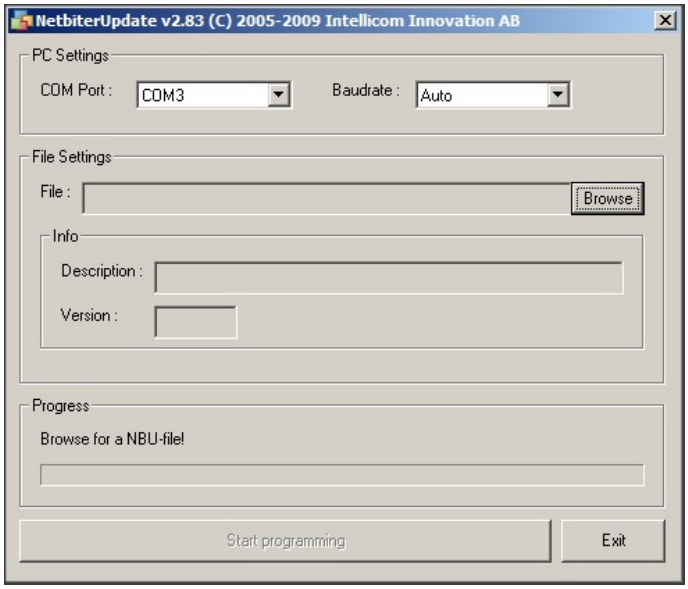


Fig. 76 Netbiter Update

4. Click on **Browse** and locate the firmware file you downloaded, then click **Open**.

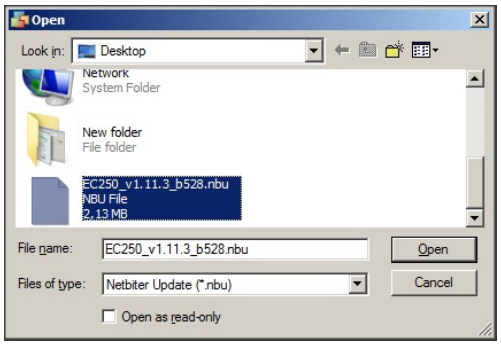


Fig. 77 File dialog

5. Power OFF the Netbiter gateway.
6. Click on **Start programming** and wait for the process to complete.

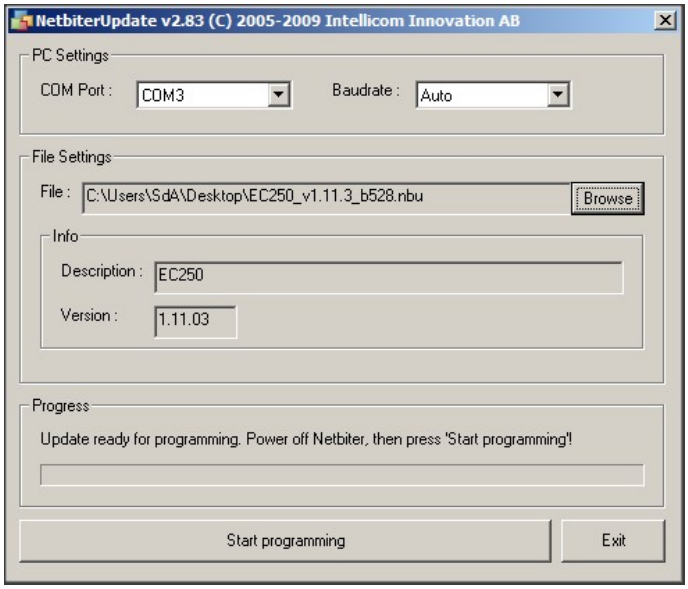


Fig. 78 Start programming

7. Power ON the Netbiter gateway when prompted to do so.

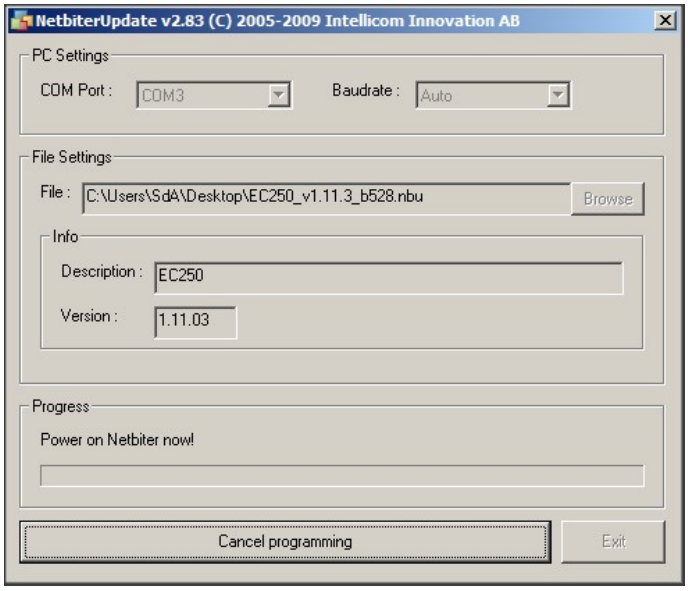


Fig. 79 Power on the Netbiter gateway

8. Wait for the tool to complete the update.

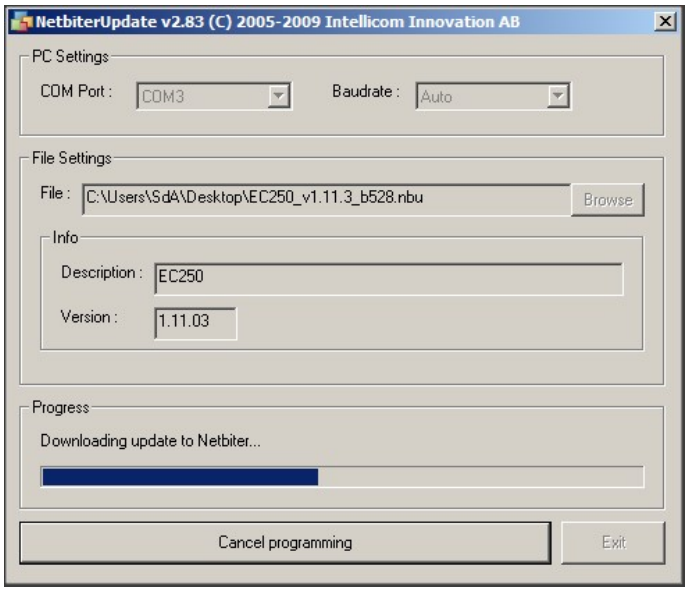


Fig. 80 Updating in process

9. When the update is finished you will be prompted to reboot the Netbiter gateway. Click on **Yes** to reboot.

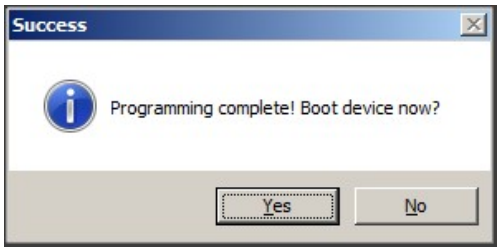


Fig. 81 Reboot the Netbiter gateway

11 EtherNet/IP Implementation

See also the ***Netbiter Argos Administration Manual*** on how to configure EtherNet/IP.

11.1 Client

Connection Type

UCMM (Class 1 and 3 connection not supported)

Adapter Timeout

1000 ms

Services

The following services are implemented:

Code	Service Name	Addressing	Note
0x0E	Get_Attribute_Single	Class, Instance, Attribute	
0x10	Set_Attribute_Single	Class, Instance, Attribute	
0x4C	Read_Tag_Service	Symbolic Segment Addressing	Can be used to access Controller Tags. Vendor specific service code (see note below).
0x4D	Write_Tag_Service		

Read_Tag_Service and Write_Tag_Service using symbolic segment addressing is only supported by some Rockwell PLC:s. Please refer to the documentation for the specific PLC for more information.

11.2 Adapter

11.2.1 Identity Object (0x01)

Class Attributes

No attributes are implemented.

Instances

Instance 1 is implemented with the following attributes:

ID	Access	Name	Value
1	Get	Vendor ID	90
2	Get	Device Type	100
3	Get	Product Code	85
4	Get	Revision	1
5	Get	Status	1
6	Get	Serial Number	...
7	Get	Product Name	Netbiter

Services

The following services are implemented:

Code	Class	Instance	Service Name
0x01	No	Yes	Get_Attribute_All
0x0E	No	Yes	Get_Attribute_Single

11.2.2 TCP/IP Interface Object (0xF5)

Class Attributes

The following class attributes are implemented:

ID	Access	Name
1	Get	Revision

Instances

Instance 1 is implemented with the following attributes:

ID	Access	Name
1	Get	Status
2	Get	Configuration Capability
3	Get	Configuration Control
4	Get	Physical Link Object
5	Get	Interface Configuration
6	Get	Hostname
13	Get/Set	Encapsulation Inactivity Timeout

Services

The following services are implemented:

Code	Class	Instance	Service Name
0x0E	No	Yes	Get_Attribute_Single
0x10	No	Yes	Set_Attribute_Single

11.2.3 Ethernet Link Object (0xF6)

Class Attributes

No attributes are implemented (= Rev 1).

Instances

Instance 1 is implemented with the following attributes:

ID	Access	Name
1	Get	Interface Speed
2	Get	Interface Flags
3	Get	Physical Address

Services

The following services are implemented:

Code	Class	Instance	Service Name
0x0E	No	Yes	Get_Attribute_Single

12 Technical Data

12.1 Dimensions

All measurements are in millimeters unless otherwise specified.

12.1.1 Netbiter EC150

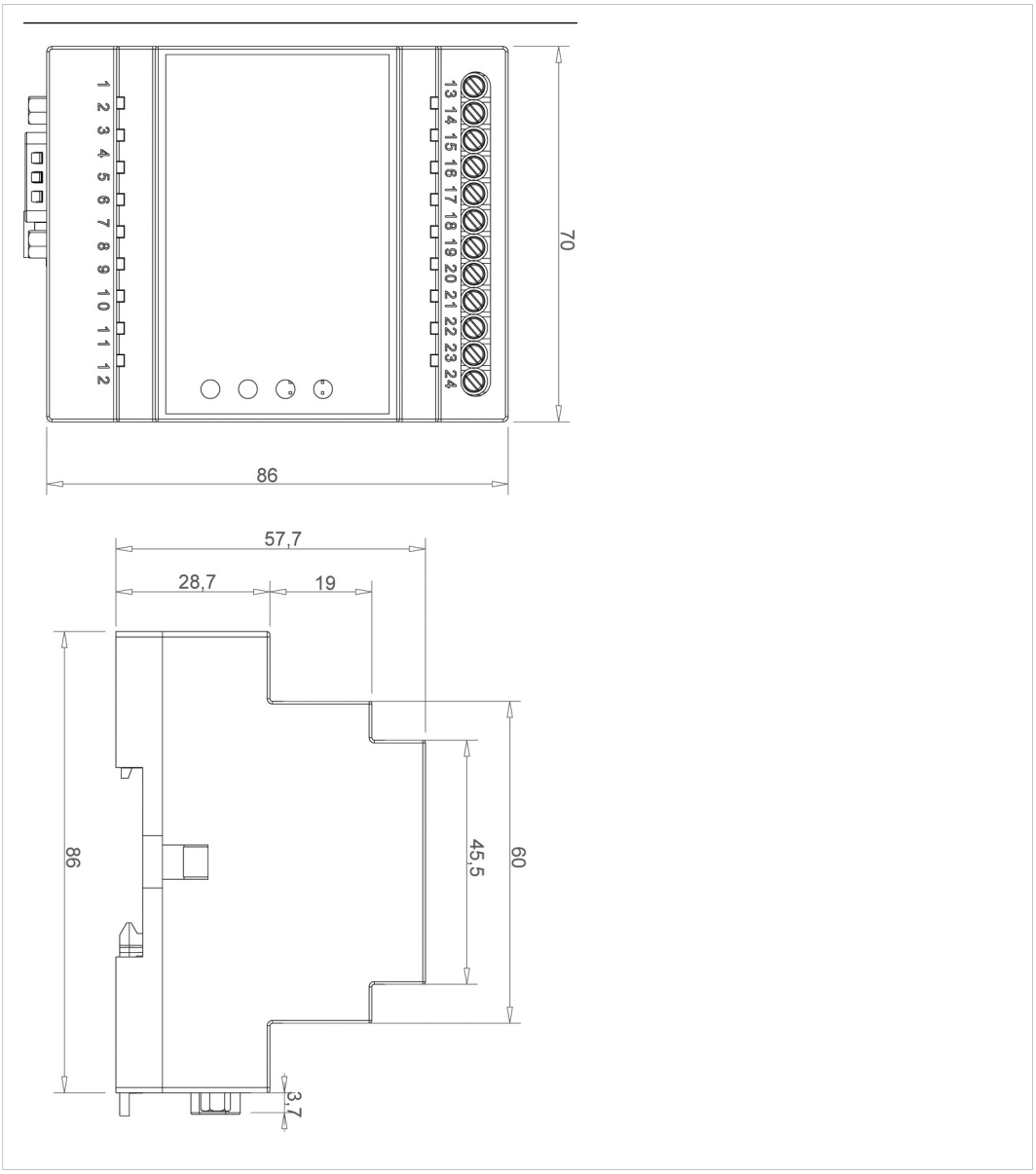


Fig. 82 EC150 dimensions

12.1.2 Netbiter EC220

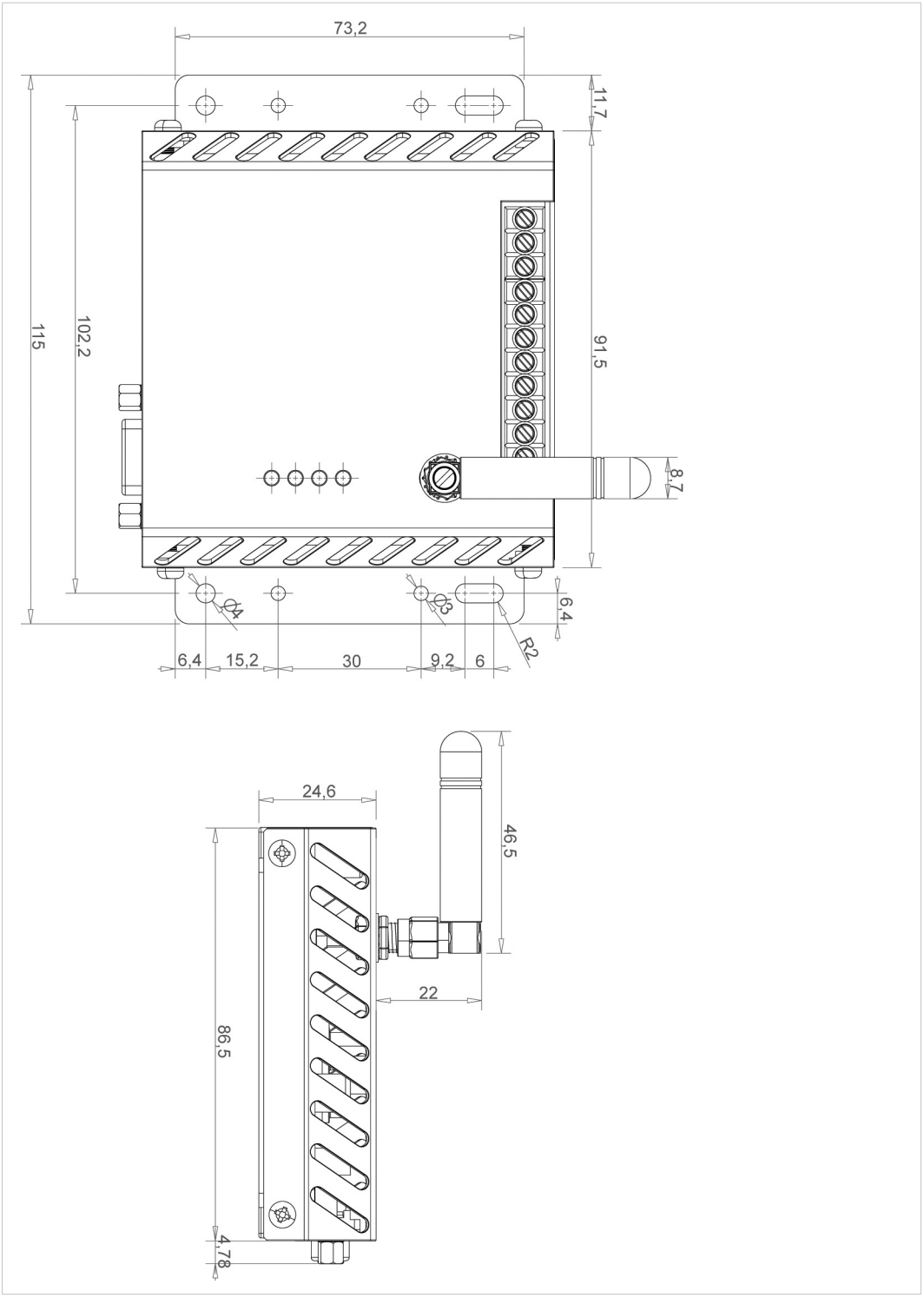


Fig. 83 EC220 dimensions

12.1.3 Netbiter EC250

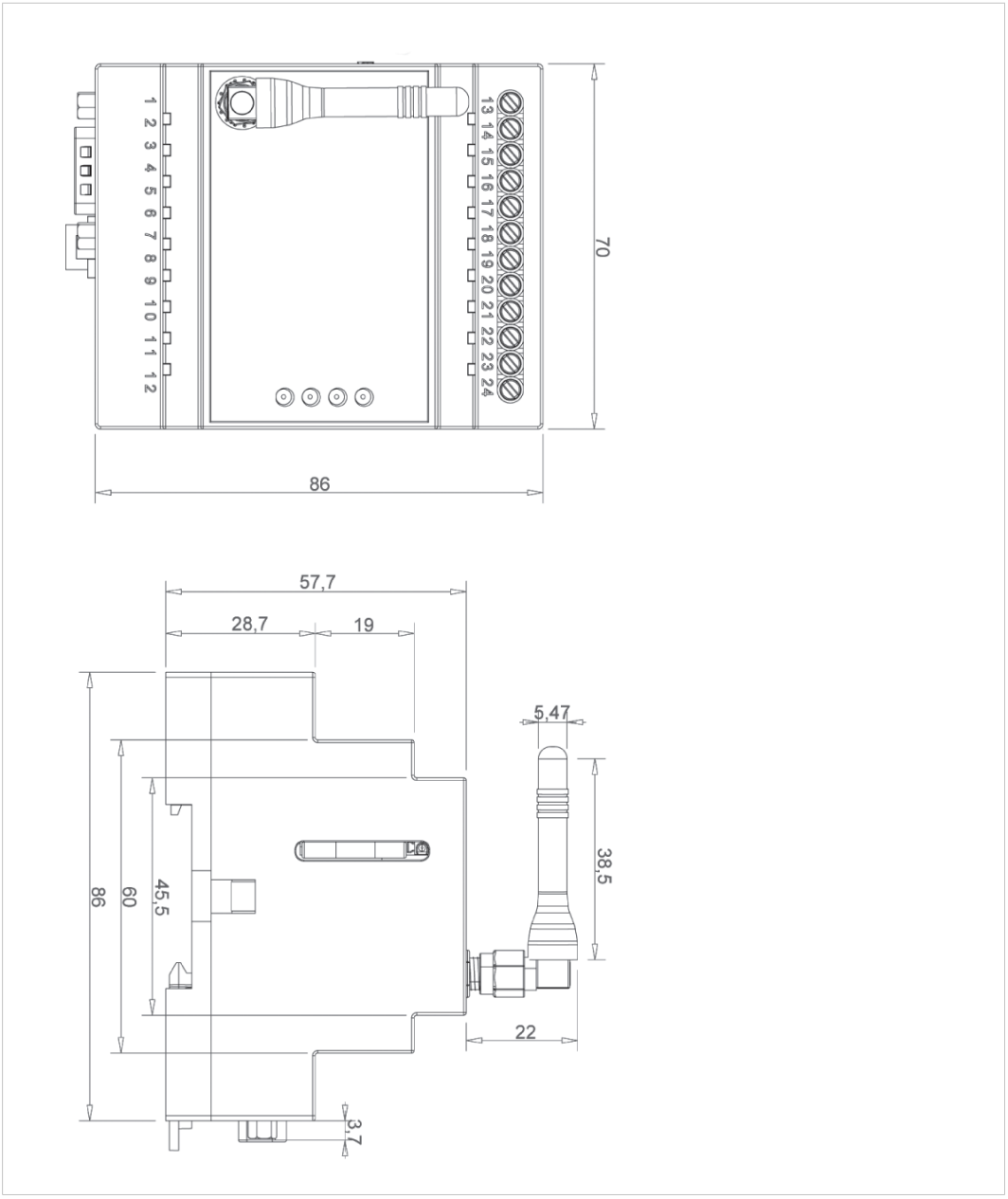


Fig. 84 EC250 dimensions

12.1.4 Netbiter EC310

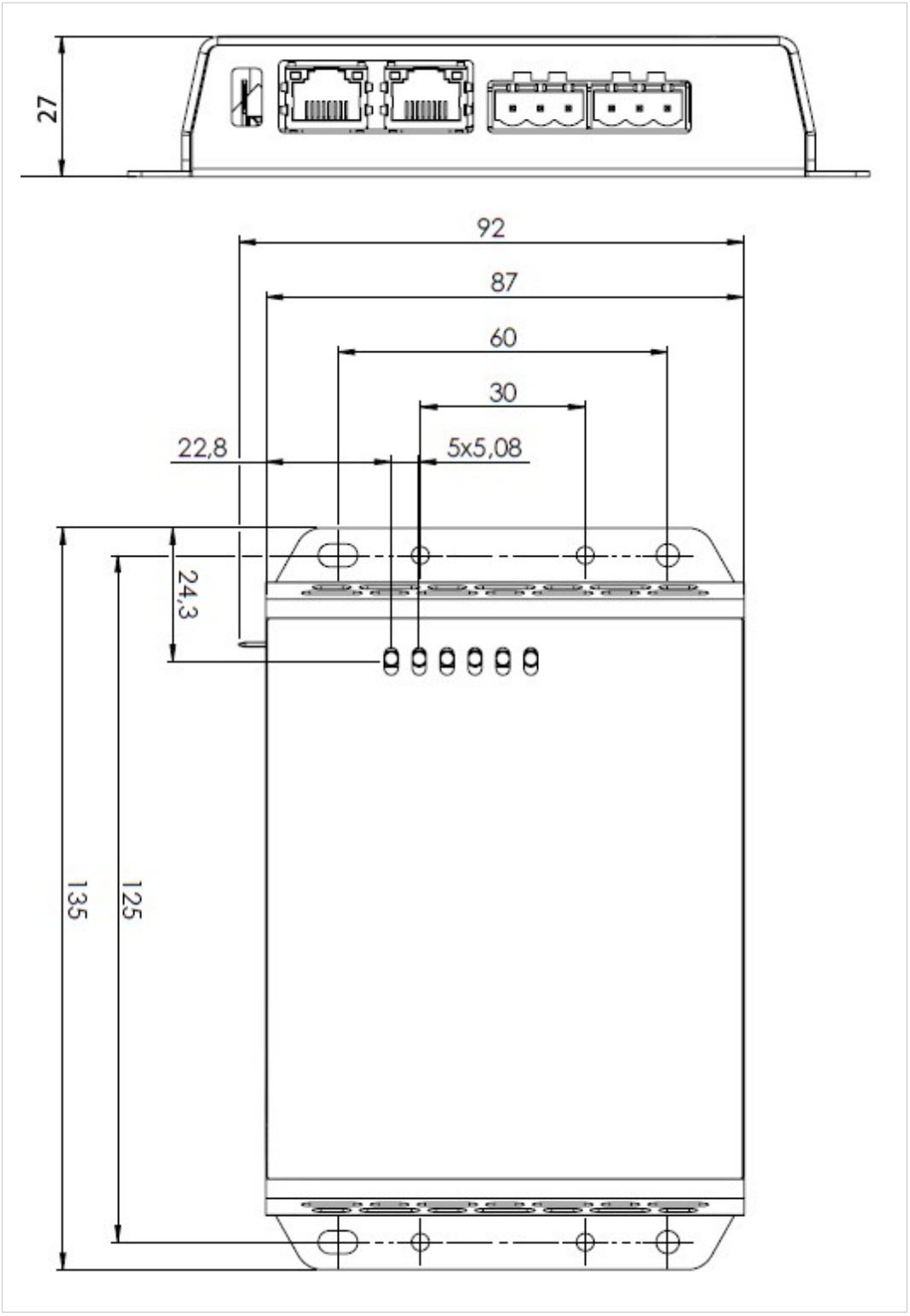


Fig. 85 EC310 dimensions

12.1.5 Netbiter EC350

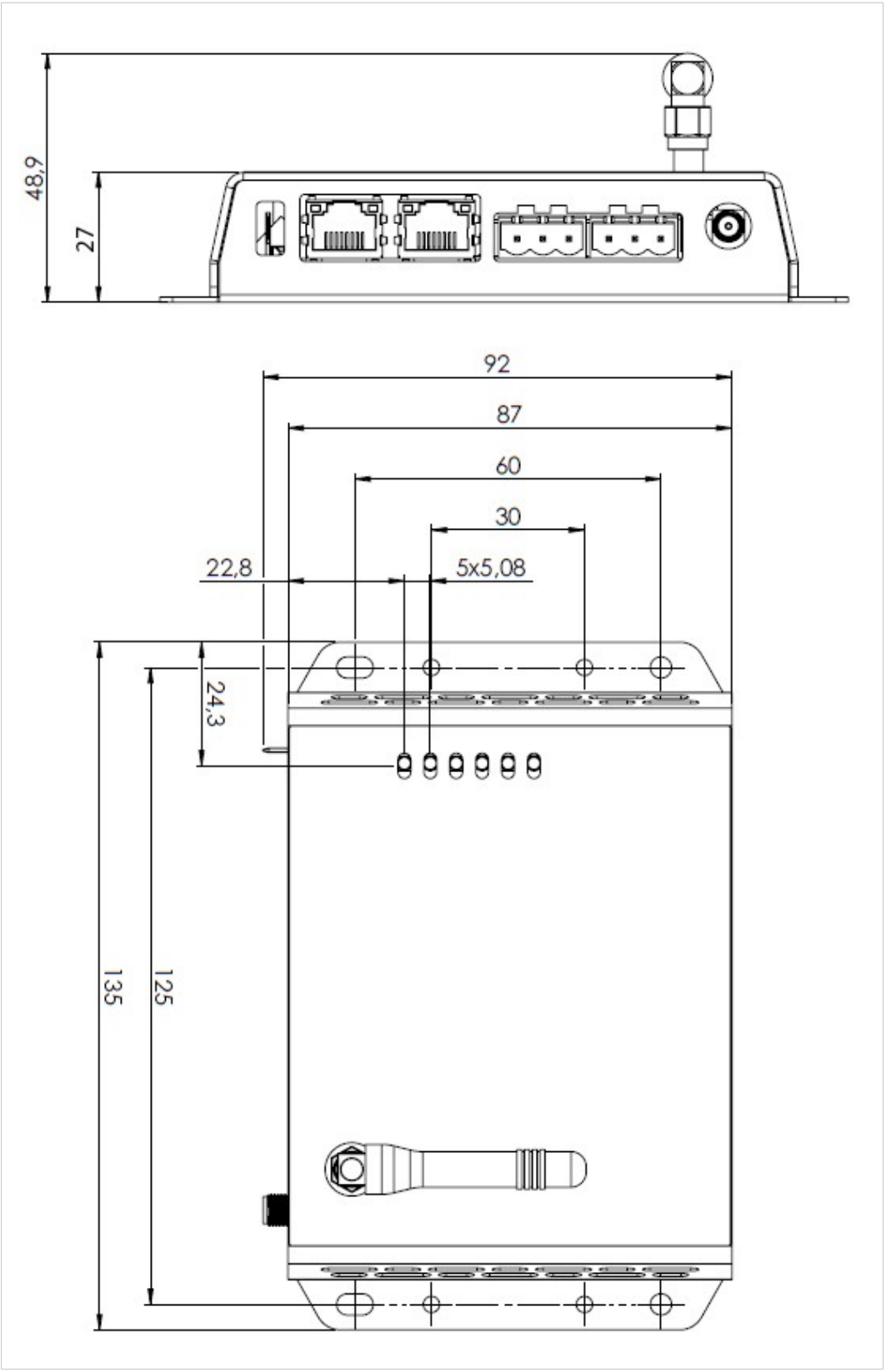


Fig. 86 EC350 dimensions

12.2 Specifications

Technical Specifications – Netbiter EC150, EC220

Model name	Netbiter EC150	Netbiter EC220
Order code	NB1001	NB1000
Ethernet	10/100 Mbit/s	-
GPRS	-	Quad band GPRS Class 12 850/900/1800/1900 MHz
Alarms	Email, SMS	Email, SMS
Relay output (max 24 V AC/DC, 1 A)	-	1
Digital inputs (isolated max 24 VDC)	2	2
Analog inputs	-	2 inputs (PT100/0–10 V/0–20 mA) Resolution: 11.25 bit (raw value 0–2400) Input tolerance 0–10 V: R=1.55 %, A/D=2 mV Input tolerance 4–20 mA: 2.14 %, A/D=2 mV
Analog output (0–10 V)	-	1
Serial port #1	RS-232 up to 115.2 kbit/s	RS-232 up to 115.2 kbit/s
Serial port #2	RS-232/RS-485 up to 115.2 kbit/s (isolated)	RS-485 up to 115.2 kbit/s (isolated)
Antenna connector	-	SMA female
Protocols	Modbus-RTU, ASCII, TCP/IP	Modbus-RTU
Connected devices	32	16
Baud rates	300–115200 baud	300–115200 baud
Wall mounting	No	Yes
DIN rail mounting	Yes	Yes (optional)
Dimensions (WxDxH)	90 x 70 x 58 mm	92 x 115 x 25 mm
Operating temperature	-40 to +65 °C	-30 to +65 °C
Storage temperature	-40 to +85 °C	-40 to +85 °C
Housing class	IP20	IP20
Power supply	9–24 V DC or AC	9–24 V DC
Power consumption	2 W	2 W
Certifications	CE, ROHS	CE, $_{C}$UL$_{US}$, FCC/IC, PTCRB

Technical Specifications – Netbiter EC250, EC310, EC350

Model name	Netbiter EC250	Netbiter EC310	Netbiter EC350
Order codes	NB1003	NB1007	NB1005 with antenna NB1008 without antenna
Ethernet	10/100 Mbit/s	10/100 Mbit/s	
Proxy support	N/A	SOCKS (authentication: none, username/password) WEB (authentication: none, basic)	
Mobile communication	Quad band GPRS Class 12 850/900/1800/1900 MHz	N/A	5-band 3G/UMTS (WCDMA/FDD): 800/850, 900, 1900, 2100 MHz Quad-band GSM/GPRS: 850, 900, 1800, 1900 MHz
Alarms	Email, SMS	Email, SMS	
Relay output (max 24V AC/DC, 1A)	N/A	1	
Digital inputs	2, isolated max 24 VDC	2, dry contact type	
Analog inputs	N/A	4 inputs, all supporting 0–10 V or 0–20 mA. Current: 0–20 mA, R=3.3 %, A/D=0.1 mV+0.15 % Voltage: 0–10 VDC, R=1.7 %, A/D=0.1 mV+0.15 % Support for PT100 on AI1 and AI3. Sensor range -50 to +150 °C. 16-bit resolution.	
Serial port #1	RS-232 up to 115.2 kbit/s	RS-232 up to 115.2 kbit/s	
Serial port #2	RS-485 up to 115.2 kbit/s	RS-485 up to 115.2 kbit/s	
Antenna connector	SMA female	N/A	SMA female
Protocols	Modbus-RTU, ASCII, TCP	Modbus-RTU, Modbus TCP. EtherNet/IP	
Connected devices	32	32	
Baud rates	300–115200 baud	1200–115200 baud	
Wall mounting	No	Yes	
DIN rail mounting	Yes	Yes (optional)	
Dimensions (WxDxH)	90 x 70 x 58 mm	135 x 92 x 27 mm	
Operating temperature	-30 to +65 °C	-40 to +65 °C	
Storage temperature	-40 to +85 °C	-45 to +85 °C	
Housing class	IP20	IP20	
Power supply	9–24 VDC	12–48 VDC	
Power consumption	3 W	4.5 W (typical) 6 W (maximum)	
Certifications	CE RoHS cULus FCC/IC (Pending) PTCRB (Pending)	CE RoHS cULus ATEX/Haz.Loc (Pending)	CE RoHS cULus Telec JATE FCC IC PTCRB RCM ATEX/Haz.Loc (Pending)

12.3 Regulatory notices

12.3.1 FCC Compliance Statement

The design of this equipment complies with U.S. Federal Communications Commission (FCC) guidelines respecting safety levels of radio frequency (RF) exposure for Mobile devices.

This product contains FCC ID: **QIPPHS8-P**

RF Exposure - This device is only authorized for use in a mobile application. At least 20 cm of separation distance between the device and the user's body must be maintained at all times.

Any changes or modifications not expressly approved by HMS Industrial Networks AB could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

12.3.2 Industry Canada Statement

This product contains IC ID: **7380A-PHS8P**

12.3.3 Netbiter EC350 Telecommunications Compliance

Japanese Radio Law and Japanese Telecommunications Business Law Compliance.
This device is granted pursuant to the Japanese Radio Law (電波法)
and the Japanese Telecommunications Business Law (電気通信事業法)
This device should not be modified (otherwise the granted designation number will become invalid)

Fig. 87 Telecommunications Compliance Statement

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